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THE IRON AGE

THE NATIONAL METALWORKING WEEKLY May 18, 1950

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To better serve the requirements of the trade and to operate at a profit in a highly competitive field, steel plant executives recognize they must have the most modern and efficient equipment available.

The Wean Engineering Company, Inc., Warren, Ohio, is the recognized leader in the design and installation of sheet, tin and strip mill equipment, whether it be one piece or a complete unit.

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As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

SPEEDAIRES on coke feeders save 53% of space

SAVING space was a prime consideration in this installation of 3 Speedaires—driving coke feeders in an Ohio blast furnace stock house. The Speedaire units, one of which can be seen here, occupy less than half the space required by standard worm gear drives of comparable capacity. In addition, use of Speedaire effected a weight reduction of 825 pounds and saved the steel company $390.00 on installation cost.

Speedaire is Cleveland's fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantage of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands. For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3252 East 80th St., Cleveland 4, Ohio.

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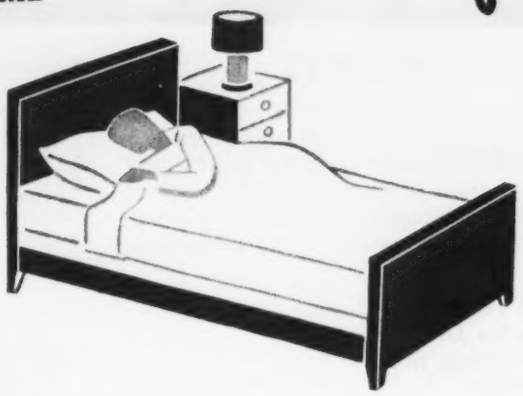

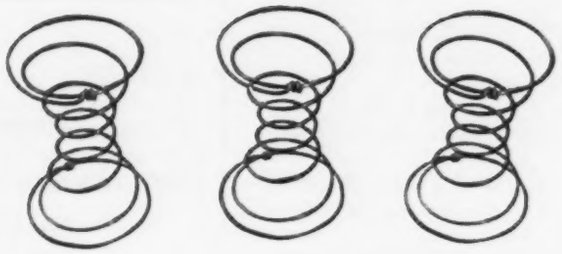

Steel springs provide deep-cushioned comfort in automobile seats, chairs, innerspring mattresses, and other places where buoyant, restful support is essential.

The wire in good upholstery springs must be a special kind of steel, one engineered for this application alone. That is why Silver Star Spring Wire is so extensively used. Leading spring and bedding manufacturers use Silver Star because it fully meets the requirements for upholstery springs.

Silver Star is a special-analysis, high-carbon wire that's carefully processed to assure easy coiling and knotting. Springs made from it have uniform height and resiliency, keep their liveliness and retain their shape through a lifetime of lasting comfort. You can count on its uniformity . . . in gage, temper, physical properties.

Silver Star is but one of Bethlehem's wire specialties. If you have a problem in the selection or processing of steel wire, it may save you time and money to ask for a Bethlehem engineer to study your requirements.

TRAVEL

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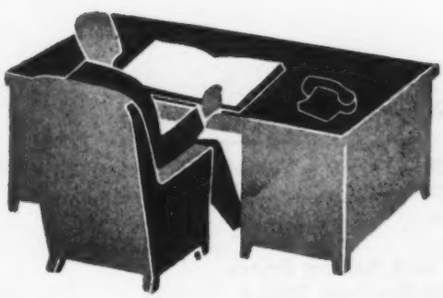

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THE IRON AGE

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MAY 18, 1950 • • • VOL. 165, No. 20

Special Article

Annealing costs can be lowered by using a 75 pct hydrogen, 25 pct nitrogen mixture produced in an ammonia dissociator. Storage and handling required with standard cylinder hydrogen is eliminated. Direct savings allow initial investment to be recovered in less than a year.—p. 81.

Issue Highlights

Newly developed radiation pyrometer measures temperatures between 180° and 400°F on moving strips of tinplate. Accurate measurements can be taken as close as 18 in. from heated strip. Development of prototype required investigations of radiation theory and studies of limitations of previous instruments.—p. 90.

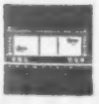
MX steel has proved its worth on a cost basis, saving from 16 to 22 pct on production runs. Comparisons between MX and B-1113 show that the new steel has, among other advantages, better elongation and reduction of area, and gives better finish.—p. 95.

Phil Murray and Walter Reuther exchanged pledges of joint action and mutual support at the steelworkers' convention last week. Joint action will cover: (1) Guaranteed annual wage, (2) more pensions and social security and (3) the union shop. Agreement on retroactive pay increases for U. S. Steel white collar workers was also announced. —p. 103.

In a surprise move last week the French suggested pooling of steel and coal production of France and Germany, and maybe all of Europe. First U. S. reaction was forthrightly favorable. British reaction was more cautious. —p. 106.

Domestic metals producers are seeking tariff protection against invasions of heavy tonnages of foreign metals. Lead producers blames the influx of foreign lead with demoralizing the domestic market last year. Reynolds and Kaiser want aluminum protection.—p. 110.

Coming Next Week



Standard fork trucks equipped with interchangeable attachments can perform a multiplicity of special handling jobs. These units release trucks from single confining operations. They eliminate the pallet return problem.

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B. F. Goodrich Burstproof costs you no more than regular steam hose, yet you get these improvements that make it last longer, serve better, and insure workers of protection from scalding and injury. B. F. Goodrich Burstproof steam hose *can't burst from steam or steam pressure!*

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B.F.Goodrich
RUBBER FOR INDUSTRY

Editorial

INDUSTRY VIEWPOINTS

Wasted Brain Power

MY friend had been personnel officer of a utility company for a short time—when he had a visitor. He greeted my friend with a "Hello."

Then he said, "Sonny, how long have you been on this job?"

"Six months," my friend told him.

"Well, whatever you do, sonny, don't let them pension you too fast. They did that to me. But I licked it. I have a desk, a phone, a pad and a spittoon.

"Every morning I play at being busy—if I didn't I might die off.

"Now you remember, sonny. Fight like a steer if they rush you on the pension roll. There isn't anything worse than not being wanted," he said as he left the office with a twinkle followed by a sad expression.

That's the sentimental part of being pensioned at 65. Why 65? It might just as well be 40, 50, 60 or 80.

Now let's look at the practical side. If a man wants to retire at 65—okay. If he does not and a medical man says he should—he should. If he is not doing the job right—it is well to pension him.

But what of the 65-year old wage earner whose health is good, whose brain is keen and whose work is good? It is downright silly to pension him. It is an economic waste. And what's more, it isn't good common sense. He's a gold mine in experience, brains and overall ability.

Suppose he is okay physically and mentally, but can't do the job he is paid for. He can do other jobs. How about safety, job training for younger men or special assignments? You will gain if you keep him on. It is also money in the bank for both of you.

How about top management? Same thing applies: Medical examination and a consensus on ability from good friends and associates. When the time comes for top men to step out of top jobs their experience and advice shou'd be sought for a price—either as a stipulated salary for such work or on a one-time basis.

You need them, you can use them and they will know they are wanted.

Tom C. Campbell

Editor

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NEW! TOTALLY-ENCLOSED NON-VENTILATED

NOW — a complete range of Totally-Enclosed Crocker-Wheeler Motors for every industrial need

To motor users who want the engineered economy of the Sealedpower Motor, yet do not require its higher ratings, Crocker-Wheeler now offers a totally-enclosed, non-ventilated motor in sizes up to 3 hp in NEMA frames 203-225.

This new line of C-W Totally-Enclosed Motors is designed for the same type of applications as the Sealedpower Motor, and is particularly suitable for hoist duty. Just as in its maintenance-saving "big brother", vital operating parts in Crocker-Wheeler's Form BE motor are sealed in a frame of sturdy gray iron, completely protected against dust, acid and alkali fumes, corrosive liquids and gases, airborne moisture, steam, metal chips, sawdust and lint.

Used to power any equipment, the Form BE motor, with its modern streamlined housing, adds to a product's eye-appeal. But the real beauty of it is, you can install this motor in inaccessible places — and forget it! The double-row-width sealed bearings are pre-lubricated . . . require no attention for five years.

Once you've checked its many advantages, you'll agree that this new motor is every inch a Crocker-Wheeler design — long on performance, short on maintenance. Now, whatever NEMA rating you need in a totally-enclosed motor, specify *Crocker-Wheeler,* and see why C-W has set the quality standard for 62 years. Send for bulletins covering the complete range. Fill out and mail coupon on the opposite page.

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► At least one television tube maker is now exploring the possibility of using porcelain enamel steel for tube cones.

► The Steelworkers strategy on the pension demands they will make at the end of 1951 now shapes up like this: The union will ask the companies to boost pensions by an amount equal to any credit they get from higher Social Security benefits.

Phil Murray isn't saying much about wage demands now but it's a good bet that next December will see him blasting steel company profits if they stay around present levels--and demanding a higher wage. Which means that another strike is possible if those demands are turned down.

► In designing its new low priced car, Kaiser-Frazer made plastic molds from the clay body sections. This entirely eliminated the usual wooden models and cut tooling time approximately in half.

► Major technological advances in steelmaking--the turbohearth, continuous casting, etc., may be some few years in reaching commercial exploitation. Meanwhile a great deal of mill machinery and equipment has been modernized. Which makes it a good bet that the next major steel cost cutting improvements will be in materials handling equipment.

► A portable "alertness indicator" signals lethargy in people doing monotonous jobs. Developed for the Navy, it has already been tried on pilots and truck drivers. It electrically records alertness levels, sounding a warning when they are dangerously low.

► The Army recently used a forklift truck and pallet to load jeeps in airplanes. Average time was 2½ min. and the ramp normally needed to load a C-54 was done away with.

► Pepsi-Cola, which is working on the market for its drink in cans, is now selling them fast in the Southeast. Orders which may total 5 million cans have already been placed. Price is 3 cans for 25¢.

► Reprint requests for the two-fisted talk that Ben Fairless made on April 21 at Baltimore have already passed the 500,000 mark and may eventually top a million. Which shows that it pays to talk turkey.

► Stainless steel sales executives are showing keen interest in the West Coast market where recent substantial orders from fabricators of products ranging from napkin rings to automobile wheel trim surprised many of them.

► Cold-rolled and galvanized sheets may be the tightest item on the books now but tinplate is running them a close race. No packs will be missed but some buyers are going to wait awhile before they get all the tinplate promised them. Tinplate departments have to compete with other sheet departments for semifinished steel and rolling mill space.

► Some financial men look for a softening of union attitudes on company profits as more and more pension funds are invested in corporate stocks--but it will probably be some years before this logic is translated into reality.

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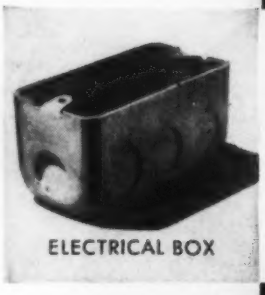
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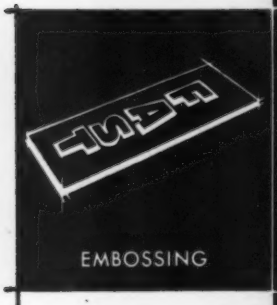
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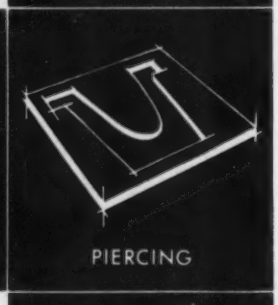
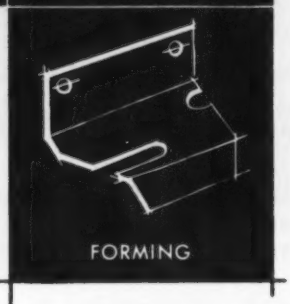

PIERCING

FEEDING PAN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Note of Hysteria in Market

Strike Magnifies Shortages

Scrap Scores Another High

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

FOR the first time in many months there was a note of hysteria in the steel market this week. Here are some of the reasons: (1) Steel producers were feeling the full force of furious and unrelenting steel demand. (2) Strikes had set back production 11 million tons since the upsurge of demand last fall—about 29 million tons in the past 5 years. (3) Fearful of interruptions of output due to lack of steel, manufacturers were mounting new pressure on every possible source of steel supply. (4) The railroad strike was multiplying the difficulties of producers and consumers alike.

This week the railroad strike was handicapping production in metalworking plants more than it was steelmaking operations. Steel consumers suffering most were those located on struck railroad lines. Trucks and barges were supplying them wherever possible. But there are limits to these facilities, and some plants can't be served by them because of geographic location or lack of loading and unloading facilities.

Some Orders Rescheduled

Paradoxically, some steel consumers were benefiting, while others were being hurt. This is what was happening in some big mills: Every order on mill schedules was being carefully studied in advance to see if it could be shipped within a reasonable time after it comes off the mill. If the finished steel might have to be stored at the mill, that order was being replaced by another that could be shipped promptly.

The luckless customer who happened to be unfortunately situated geographically faced the unhappy prospect of awaiting the end of the strike when his order will be rescheduled. The mills had to take this action because of limited storage space. Even a few days production of orders that couldn't be shipped would force a shutdown because of lack of storage room.

The outlook for steelmaking was not so grim. Major curtailments because of shortages of ore, coal and limestone were not an immediate prospect. In the Chicago area raw materials are delivered mostly by boat. In the Pittsburgh area most coal moves by barge and ore stocks are generally adequate for the immediate future, although cutbacks will be in order if the strike continues more than a week or two. Operations this week are scheduled to continue 100.5 pct of rated capacity.

Scrap a Big Problem

But scrap is another problem. This is where the raw material pinch will be felt first. Reports indicated that scrap shipments had already been slashed 30 to 40 pct in some areas. There was no doubt that the rail strike had put a damper on scrap prices which last week had threatened to run wild. Nevertheless, price increases were still fairly general, and THE IRON AGE steel scrap composite price moved to new high ground for the year.

Conversion is becoming even more popular with consumers as a means of getting steel (at a higher cost). Big converters are not taking any more orders for the rest of the year. But customers are putting pressure on them to accept orders for the first quarter of 1951.

Conversion is also inflating the scrap market. Brokers are reluctant to accept orders based on current quotations. And there is plenty of evidence that speculation is playing an important role in some areas. Foundry scrap items are also on the upturn because of marked improvement in foundry business.

Tight Market Will Continue

This week the pressure for steel is still increasing. Although demand is strongest in the Midwest, most major steel items are now tight in all areas. Consumers in the Midwest are running into a continued shortage of bars, plates and shapes. When they can't get orders filled by local mills they are reaching into the East to get them.

Both steel consumers and producers recognize that the outlook is for a very tight market in steel for many weeks. Customers who normally would deal through district offices of producers were streaming into home offices this week.

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Just to set you straight

If you harbor the notion that our work is confined to shipbuilding, take a look at one of our non-marine jobs illustrated above—a 52,000-pound cast iron bed plate for a Corliss engine, cast in one piece. And that isn't all. Sun Ship also produces a wide assortment of fabricated steel items including chemical plant and oil refinery equipment. Consult with Sun Ship . . . our versatile organization plus our vast experience and facilities can help you in many ways.

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SHIPBUILDING & DRY DOCK COMPANY

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behind your Production Curve?

. . . maybe it needs this improved

MACHINABILITY

● It sometimes happens! A robust parts production curve climbs steadily . . . but in spite of every remedy at hand, the profit curve develops anemia—just doesn't have the stuff to make the grade.

Is *your* profit curve as healthy as it might be? Maybe *it* needs the same "shot in the arm" that has helped other parts producers—the kind of MACHINABILITY that has made Republic Union Cold Drawn Steels famous.

Yes, famous—and for very good reasons! At Union Drawn the first and foremost aim of metallurgists and engineers always has been MACHINABILITY—*uniform* MACHINABILITY.

Little wonder, then, that these men know so much about this vital factor in the mass production of steel parts . . . and how to produce steel bars that cut equally well whether shipped today, next week or next year.

If you've never used Republic Union Cold Drawn Steels, here's what you can expect: 1. Uniformity throughout bar after bar and shipment after shipment. 2. A remarkable freedom from tool-wearing abrasive elements. 3. Smooth, bright machined surfaces. 4. Top production efficiency. 5. Low unit costs. All of which stimulate the profit curve.

Now—how to apply all this to your own operations to get the most out of it? Just ask us to put Republic metallurgists and engineers to work for you. It's their job to see that you use the right steel in the right way—to help you get that profit curve back up where it belongs. Call your nearest Republic District Sales Office—or write us.

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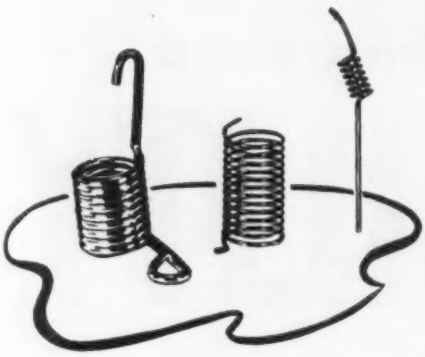
Here's News of Importance to All Quantity Users of Springs



IF you are a user of large quantities of precision springs of any type we have a proposition that may very well result in a substantial reduction in costs for you. All we ask is the opportunity to have our engineers go over your spring requirements. Our experience indicates that the application of our "know-how" and modern facilities can often result in lower costs through improved manufacturing methods.

Good examples of our ability to save important amounts of money for our customers are the springs sketched above. In each of these, improved forming methods developed by Accurate reduced costs to a fraction of what they had been.

Now, we would like the opportunity to do the same for you. There's no obligation on your part so write today.

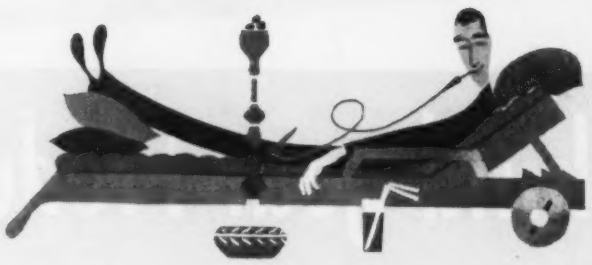
Accurate Springs

COST CONSCIOUS QUALITY
Since 1930

ACCURATE SPRING MFG. CO.

3819 W. Lake St. • Chicago 24, Ill.

Springs, Wire Forms, Stampings



Fatigue Cracks

By CHARLES T. POST

Spouse

Marshall Plan officials confirm findings that engineers are among the best marital bets. The ECA had it all planned to send some mining engineers abroad to help do a little prospecting. But recruiting has run into a snag—all because of women.

Some of the jobs are in territory considered uninhabitable for the distaff. Mama says to papa, "If I can't go, you can't either." Even when provision is made for the girls to follow in 6 months, when housing will be available, mama puts her foot down. "Too long a separation." Jobs in other areas, such as laboratory work and assaying, are open to women. A number have applied—but the husbands balk unless they can go along, and uncle says, "No!" As a result only 11 of the 60 or so jobs have been filled to date.

Why not hire bachelors and spinsters? It appears that all those with professional qualifications got married as soon as they received their degrees. Not enough left to go around now.

Functional Design

The tobacco industry has responded with thunderous silence to our suggestion that it market butt-size cigarettes for one-puff housewives who flit from room to room. This week our gratuitous suggestion is a sure-fire item for wire-forms and stamping shops which can't find enough to do.

Why not make magazine racks to match the plumbing fixtures? These mahogany racks are fine from a design standpoint, but they're incongruous alongside porcelain enamel and tile. A metal job, with baked enamel finish, would go fine. Have a choice of pastel colors, if you like, to harmonize with these flashy new uh-powder rooms. Offer two models—a console at $9.95 to set on the floor, and a tank-top model at $4.95.

We've had a chance to do a lot of thinking about this one, and can give the right item your favorite family journal's seat of approval.

Winchell Please Copy

What rugged Western character who wooed and won the princess of his dreams in the advertising pages of your f.f.j. expects an heir soon? The advertising agency pledged us cupids to secrecy.

Puzzler

If you sit on the right side of the train, watch out the window carefully, and count every train coming from Buffalo (including the one pulling into New York as your train is leaving and the one pulling out of Buffalo as you arrive) your answer to last week's puzzler will be 25. As Sidney Reibel points out, you have met 12 before, at the half-way mark, you see the train that left Buffalo the same time as you left New York.

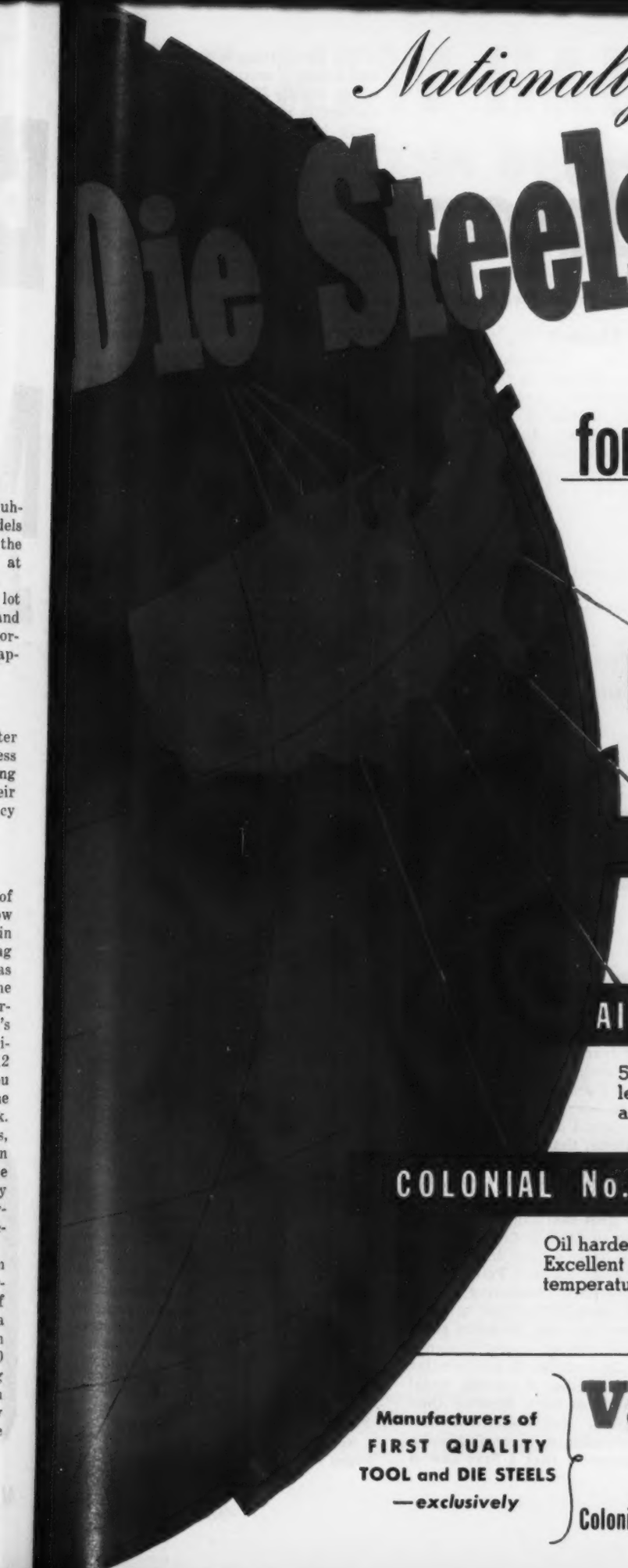
L. M. Spaven, Camera Works, Eastman Kodak, and Martin Baron, Sears, Roebuck, figured the distance traveled by the military courier, but no one's followed correctly the case of the elastic angleworm yet (May 4).

Here's one for the farmers from Bernard B. Glowacki, Washington: How many square feet of grazing ground is available to a cow when tied to a rope which permits the cow to reach out 100 ft, the other end of the rope being fastened to the corner of a barn which is 25 ft square? The cow can graze on all four sides of the barn.

Nationally known

Die Steels

for cold work



OHIO DIE

Air hardening high carbon—high chromium steel for high wear resistance. Free from movement in hardening.

CROCAR

Oil hardening high carbon—high chromium steel for highest wear resistance. Free from movement in hardening.

AIR HARD

5% chromium air hardening steel. Excellent combination of strength, toughness and wear resistance.

COLONIAL No. SIX

Oil hardening die steel for general purposes. Excellent machining qualities; low hardening temperature; low movement in hardening.

Manufacturers of FIRST QUALITY TOOL and DIE STEELS —*exclusively*

Vanadium-Alloys STEEL COMPANY

LATROBE, PENNA.

Colonial Steel Division — Anchor Drawn Steel Co.

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Dear Editor

Letters from Readers

Big . . . Little?

Sir:

Read your editorial in the April 27 issue and think it is a very humorous and realistic resume of what is happening to us today. I would like to ask your permission to reprint this editorial in a small house organ which we publish for a client. This client is an envelope manufacturer and has no association with the metal working industry.

L. B. LANGSDALE
Langsdale Advertising
Baltimore, Md.

Your interest in the editorial "Big . . . Little? Big . . . Little? Big . . . Little?" is appreciated, and permission is granted for its reproduction.—Ed.

Worldwide Distributor

Sir:

We would very much appreciate your permission to distribute to State Dept. missions in continental Europe, Latin America, the Middle East, the Far East and Africa for translation and possible re-publication in local periodicals "And Now—Titanium Tubing" by A. M. Bounds from your Apr. 6 issue.

DOROTHY BOYCE
Deputy Chief, Field Publications Section
U. S. Dept of State
New York

Glad to be of service.—Ed.

Cutting Rule Blanking

Sir:

We have read with a great deal of interest the article entitled "Blanking Sheet Metal Parts with Steel Cutting Rule," in the Jan. 12 issue. The average reader would assume, after reading this article, that the technique is new and recently developed by Boeing Airplane Co. You may be interested to know that the writer had a great deal to do with starting this method of blanking in 1940 and it was first put into use based on our development at Edo Aircraft, College Point, N. Y.

From this early beginning, many of our customers blanked out aircraft parts during the war, in many cases using our cutting-out presses designed originally for cardboard and similar materials. The idea of cutting metal parts even dates back further than 1940, although the adaptation was made at this time to aircraft blanks. My recollection is that I first saw it in use for cutting a combination steel and asbestos motor head gasket, back in the middle 30's, so you can see that the art is a very old one and apparently has been re-discovered by the author of the article.

The Sheridan type Triple Toggle Press with either cam or crank actuation and with an up-working bed has proved most satisfactory for difficult die cutting jobs. This is attributed to the fact that all parts are under compression and with any lost motion taken up by the weight of the up-working platen, which gives a cut without "jump," which tends to flatten the cutting rule.

T. B. HAWKES
Chief Engineer
Sheridan Iron Works
Champlain, N. Y.

The inference, if such was the case, that this process is a new development was unintentional. The article was meant to present current adaptations of the technique at Boeing Airplane Co. Thank you for your factual comments and additional background on this method of blanking.—Ed.

Mounting Specimens

Sir:

Would you please inform us as to how we can obtain the necessary information in order to incorporate the method of mounting metallographic specimens at room temperature, as shown in your Apr. 6 issue.

S. R. BEGG
Chemist
American Screw Co.
Willimantic, Conn.

Details on mounting metallographic specimens at room temperature may be secured through the National Bureau of Standards, att: D. L. Smith, Washington 25, D. C.—Ed.

Profit Prophets

Sir:

We were naturally interested in your recent article (March 30) on Lukens Steel Co., and the following sentence especially caught our eye.

"Competitors suspect that Lukens has more than a crystal ball in anticipating trouble and divining market trends."

The Institute for Trend Research is proud to be part of this "more than a crystal ball."

MARJORIE HOSKINS
Director of Special Research
Institute for Trend Research
Hopkinton, N. H.

C of C Inquiry

Sir:

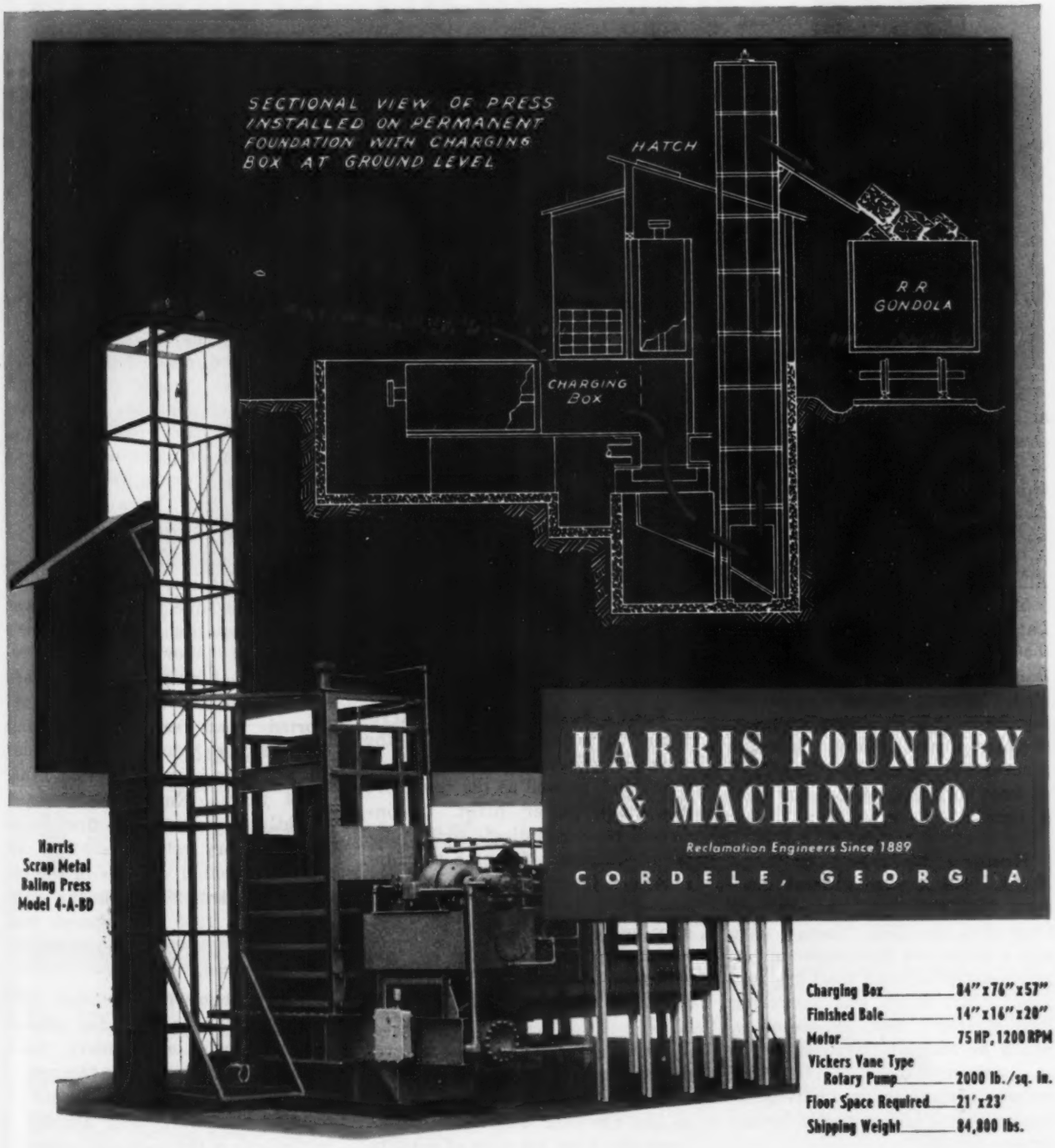
I came across your excellent article in the Apr. 27 issue of THE IRON AGE entitled "Depreciation Rules Curb Industrial Progress." I would like very much to have 30 copies of this special report to mail to the members of our manufacture committee, if you have a supply available for this purpose.

R. D. SIVERSON
Acting Manager
Dept. of Manufacture
U. S. Chamber of Commerce
Washington

Your interest is appreciated, and we are happy to oblige.—Ed.

THE NEW HARRIS PRESS
WITH BOTTOM DROP OUT FOR BALES
Faster • Cleaner • More Profitable

The new Harris Press with its revolutionary bottom drop-out design averages 38 to 43 bales an hour (avg. wt. 300 lbs.) That's 6½ tons every sixty minutes! This extra speed means extra profits for you. Our engineers stand ready to advise and help on every installation. Write for full details on this sensational new Harris Press . . . Model 4-A-BD.


SECTIONAL VIEW OF PRESS INSTALLED ON PERMANENT FOUNDATION WITH CHARGING BOX AT GROUND LEVEL
HATCH
R R GONDOLA
CHARGING BOX

Harris Scrap Metal Baling Press Model 4-A-BD

HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

CORDELE, GEORGIA

Charging Box	84" x 76" x 57"
Finished Bale	14" x 16" x 20"
Motor	75 HP, 1200 RPM
Vickers Vane Type Rotary Pump	2000 lb./sq. in.
Floor Space Required	21' x 23'
Shipping Weight	84,800 lbs.

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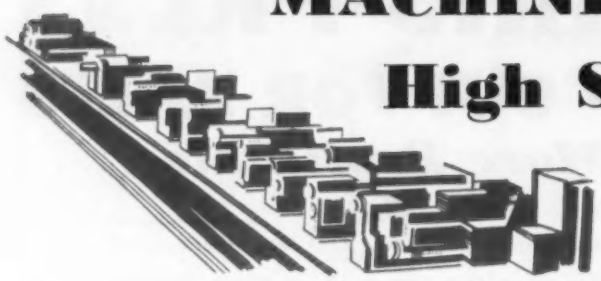


Sales Inquiries and Production

By W. A. LLOYD

Sales Booster—Seventeen machine tool builders are making a concerted effort to overcome some of the obstacles encountered in selling the South and Central American machine tool markets. Last week they united their efforts with formation of Machine Tool Affiliates Trading Corp. (Matcorp).

The plan will work like this: Latin American countries will buy tools through the Export-Import Bank on an 18 month payment plan. Matcorp will set up a revolving fund of $1.5 million to insure the bank against losses. This also assures the machine tool builder of at least 75 pct of cost of machines at time of delivery.

Hungry Speaker—In Pittsburgh, Tell Berna, general manager NMTBA, told the Hungry Club that the CIO "doesn't dare risk a debate on the subject of the relationship between machines and jobs." Mr. Berna was answering Phil Murray's Mar. 29 speech in which he claimed "introduction of . . . new machinery . . . that increases per capita productivity of the individual is responsible for extensive lay-offs."

Mr. Berna said, "Jobs have increased in direct ratio to mechanization. Employment in the auto industry was launched on a large scale only when machine tool makers built and Henry Ford installed equipment that enabled him to sell autos at a price within reach of the ordinary householder. If he is sincerly concerned . . . he would do well to investigate and correct union restrictions on productivity which forbid the operator to get out of a good new machine the production potentialities that are built into it."

Order Volume Holds—In major markets the upturn in machine tool order volume appears to be holding. In Detroit, particularly, signs are increasing that specialized machine tool facilities are destined to be crowded for months. Suppliers of standard items are also enjoying good volume.

Ford 6 Business—Additional releases have been reported on the new Ford 6 engine to be built in Cleveland, as well as the new Ford 8-cylinder power plant. Unconfirmed reports indicate some long-term equipment for both the Lincoln and Mercury may have been placed. It is believed that Ford may be ready to issue letters of intent or the equivalent on this equipment by the end of the month.

Chrysler Perks Up—As predicted, the end of the Chrysler strike has given a shot in the arm to the Chrysler 8-cylinder engine program. Also, the pace of activity on a new 6-cylinder power plant has quickened noticeably. Interesting developments on this program are anticipated in the near future.

GM Fairly Active—At the moment, GM is fairly active in plant modernization and product improvement. Trade sources have pointed out that both Chevrolet and Pontiac, and possibly Buick, are overdue for a major engine change. Some developments on this can be expected before the end of the year.

Studebaker Transmission—Production of the new Studebaker automatic transmission at the Detroit Gear Div. is now going forward at a good pace. In view of this it will not surprise Detroit to hear an official announcement by Studebaker in the near future.

Demand Delays Changes—Indications are that new model changes by major auto firms will probably be delayed in view of present high demand for cars. But any signs of weakness in the market will probably result in rapid acceleration of plans which are in many cases already well advanced.

Predicts High Output—In Washington, a high level of production and employment in 1950 for the machine tool industry was forecast by the Dept. of Labor's Bureau of Labor Statistics. Predicting that output may increase 2 pct over 1949, the Bureau reported that early-year buying brought the industry's new order index to its highest level in nearly 4 years. Employment turned slightly upward for the first January-February gain since 1946. In 1942 production workers in the industry totaled 125,000; in the early months of 1950 employment had dropped to 36,000, approximately the 1939 level.

The Bureau's report stated that new orders have been for special purpose tools or standard tools with special purpose attachments and as a result "whole segments of the industry have been unable to participate in the increased orders."

Looking for savings?

PRODUCTION JUMPS 43% HANDLING THESE SMALL PARTS

Here's a picture of savings in the making. Operator sets up machine for automatic cycle operation and engages the Mono-Lever Control just once for each cutting cycle. Result: a 43% production gain on this small parts milling job.

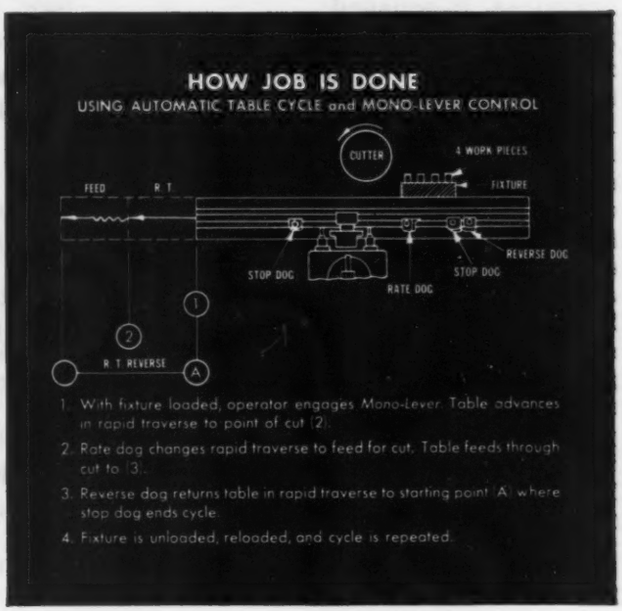

HOW JOB IS DONE
USING AUTOMATIC TABLE CYCLE and MONO-LEVER CONTROL
CUTTER
4 WORK PIECES
FIXTURE
FEED
R.T.
STOP DOG
RATE DOG
STOP DOG
REVERSE DOG
1
2
R.T. REVERSE
A
1. With fixture loaded, operator engages Mono-Lever. Table advances in rapid traverse to point of cut (2).
2. Rate dog changes rapid traverse to feed for cut. Table feeds through cut to (3).
3. Reverse dog returns table in rapid traverse to starting point (A) where stop dog ends cycle.
4. Fixture is unloaded, reloaded, and cycle is repeated.

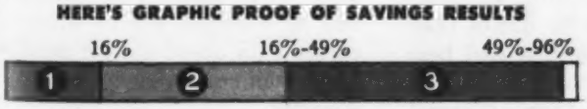
Diagram shows how machine mills four workpieces at a time without constant operator attention. Automatic cycle eliminates need for hand "inching" operation to cut. Operator easily inspects and burrs finished pieces while machine is running.

COMPARE

Production by old method.

Production gain using a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.

HERE'S GRAPHIC PROOF OF SAVINGS RESULTS



1. The minimum over-all savings reported from any job when done on a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.
2. The *majority* of over-all savings from jobs done on these machines fall here.
3. Under favorable conditions, several jobs done on these machines have shown savings like this!

How are your milling costs? The typical job data given here plus the bar graph, at left, shows you what other users of new Kearney and Trecker Milling Machines with Mono-Lever Control and Automatic Cycle have done to reduce their milling costs. It also shows what these machines can do to reduce yours — from *16%* to *96% on most milling operations!*

Contact us or our nearest representative today. Get proven facts on how Kearney & Trecker Milling Machines with Mono-Lever Control can cut your costs — increase your savings. No obligation. Kearney & Trecker Corporation 6784 West National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

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PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

Stainless Discussed

The properties of stainless steel are discussed in a new 12-p. booklet entitled "Stainless Steel for Heat Resistance," which outlines the proper grades to use for parts subjected to heat. The distinctive characteristics of each grade are given, along with recommendations as to the type of service for which each is best suited. This new booklet will prove a handy reference manual for material and design engineers who desire basic information on high temperature metal applications and data on how to select the most economical type of stainless steel for any use. *Armco Steel Corp.*

For free copy check No. 1 on postcard.

Oil Seal Data

A new brochure, entitled "Johns-Manville Clipper Seal" is a 16-p. handbook of useful data for anyone needing information on oil seals. The booklet is divided into sections on the principle of Clipper Seals, their construction, advantages in various applications, installation data and other pertinent information of interest to designers, engineers, and maintenance men. *Johns-Manville Co.*

For free copy check No. 2 on postcard.

Die Assembly Info

With increasing use of header dies employing carbide die nibs for heading bolts, screws, rivets and similar parts, a new 4-p. bulletin was prepared, giving detailed instructions for assembling and finishing such dies. Useful information is presented on preparation of the rough nib for assembly, heat treatment of the die case, and methods of finishing and assembly of the nib case. A nomograph for rapid determination of the amount of press fit required for assembly of any given size of die nib in a steel case is included. *Carboloy Co., Inc.*

For free copy check No. 3 on postcard.

Combating Rust

How to combat rust throughout the production process in metalworking plants is the subject discussed in the new Oakite Service Report. It offers a concise account of tested methods for removing rust from raw stock, for cleaning and derusting in one operation, for preventing rust while parts are being processed, and for preparing metal for paint, with protection against rust before and after painting. *Oakite Products, Inc.*

For free copy check No. 4 on postcard.

Heat Treating Stainless

There are fewer more important factors in the application of stainless steels for specific duties than their successful selection and heat treating to serve the purposes of many types of products. Correct heat treating procedures and average mechanical properties obtained with various tempering temperatures for a variety of stainless steels are described in a new 12-p. booklet. *Atlas Steels, Ltd.*

For free copy check No. 5 on postcard.

Phosphate Coating Chart

The new ACP phosphate coating chemicals selection chart is a handy guide to selection and use of metal coating products and processes for the metalworking industry. Concise information is presented for easy reference under such headings as metal surfaces treated, type of coating, method of application, scale of production, typical products treated, chemicals required, precleaning methods, phosphating bath conditions, acidulated rinse, coating weight range, after treatment, and government specifications. *American Chemical Paint Co.*

For free copy check No. 6 on postcard.

Gas Flow Rate

A new bulletin describing air and gas flow rate indicators with improved design has just been issued. Flo-Scopes, individually calibrated for the characteristics of the gases to be measured, are used with combustion equipment and in chemical plants where accurate data about gas-air mixtures are required. *Selas Corp. of America.*

For free copy check No. 7 on postcard.

Metal Cleaning Hints

Data in a new 24-p. catalog includes a brief discussion of metal cleaning principles, plus photos and

Turn to Page 124

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NEW

PRODUCTION IDEAS

New and improved production ideas, equipment, services and methods described here offer production economies. For price and other information, fill in the attached card and mail it.

Steel Cutting Carbide

The new Adamas Grade D tungsten carbide for steel cutting tools has shown uniformly high and consistent performance records in recent field testing. It is designed for general purpose machining of steel and can be used on interrupted cuts and roughing cuts. Good edge wear combined with toughness give this carbide a wide range of applications. *Adamas Carbide Corp.*

For more data check No. 17 on postcard.

Round Steel Punches

A complete line of standardized interchangeable round punches made of high speed steel incorporate the R-B interchangeable feature in which a ball bearing lock in the retainer engages in a ball seat on the punch shank, providing secure positioning radially and vertically. The design permits instant insertion or removal of either the punches or dies. *Richard Bros. Div., Allied Products Corp.*

For more data check No. 18 on postcard.

Knurling Tool

A two-way knurling tool for hand use, designed for easy knurling of long or slender work, is built like a steadyrest. Two knurls revolve on stationary centers at the back of the work, and the third knurl is adjusted by means of the screw handle. The micrometer-type frame is a case-hardened steel forging. Overall length is 7 in. Work diameter capacity is ¾ in. max, 3/32 in. min. Knurls are ½x3/16 in. with a 3/16 in. diam hole, available for either straight or diamond knurling patterns. *Wade Tool Co.*

For more data check No. 19 on postcard.

Greasing Outfit

Two elements comprise a new greasing outfit — a loading pump and a grease gun. The loading pump is mounted in a rigid steel cover that fits the top of a 25 or 35 lb lubricant bucket or pail. With

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NEW

PRODUCTION IDEAS

Continued

a few strokes of the pump handle the gun is filled with lubricant through a loader valve on the pump and a loader fitting on the gun. Model 7185-A, called the Dyn-O-Luber, is equipped with a Dyn-O-Mite gun weighing 2 lb and greases 55 bearings. Model 7185-B, the Dyn-O-Pistol, has a gun with 9 oz capacity. Pressure of grease delivery at the fitting is controlled by the operator to fit the requirements of the bearing being serviced. Guns are detachable. *Stewart-Warner Corp.*

For more data check No. 20 on postcard.

Stretch-Resistant V Belt

A new type V belt, for single and multiple belt drive, is constructed of leather and has a built-in tension-guard of a row of rayon cords bonded between the leather plies, that minimizes stretch. The V belt is supplied in rolls or in endless belts. It is cut to fit the drive and can be spliced endless, in place, on the sheaves. *Chas. A. Schieren Co.*

For more data check No. 21 on postcard.

Hydraulic Vise

Hydraulic action leaves both hands free for every operation of a new vise that is closed, locked and released by a simple two-pedal foot control. A large pedal in a floor unit controls the closing of the vise and the application of pressure. A smaller pedal is used for release. Maximum gripping pressure between the jaws is 6000 psi. A safety valve protects the tool against overload. The vise is a swivel-type with 3½ in. jaw width and 6 in. jaw opening. *Columbian Vise & Mfg. Co.*

For more data check No. 22 on postcard.

Motor Starter

The new ac magnetic, non-reversing De-ion Life Line starter is a combination breaker and motor starter within the same enclosure. Designed for either across-the-line starting of squirrel cage induction motors, or as a primary switch for wound rotor induction motors, the unit provides protection of motor, machine and operator. Available in NEMA sizes 0 through 4, the Life-Line starter can be applied to integral horsepower motors up to 100 hp. It is supplied in standard ac voltage ratings from 110 to 600 v at frequencies of 60, 50, and 25 cycles, for three-phase, two-phase four-wire, and single-phase operation. *Westinghouse Electric Corp.*

For more data check No. 23 on postcard.

Gear-Type Tube Benders

Full 180° bends, and positioning at any point on the tubing without disassembly are advantages of new gear-type tube benders. High gear ratio is said to make bending easy, and tubing will not flatten or kink, because bends are formed by an action similar to original drawing of the tubing. Benders are used with copper, brass, aluminum or steel tubing, including Bundy and thin-wall conduit. There are individual benders for ½, ⅝, ¾, ⅞ and 1⅛ in. OD tube sizes, and nominal tube sizes ⅜, ½, ⅝, ¾ and 1 in. Combination benders will take several sizes. *Imperial Brass Mfg. Co.*

For more data check No. 24 on postcard.

Indicating Pyrometer

With front dimensions of 7½ in. wide x 5 in. high, a new indicating pyrometer, Model 192, for flush and surface mounting, is designed for applications where size of the heating equipment or space limitations demand the use of a small, sturdy instrument. The high resistance edgewise movement with Alnico V magnet and wide open mirrored scale is fully compensated and enclosed in a dustproof housing. *Wheelco Instrument Co.*

For more data check No. 25 on postcard.

Loading Platform

Leveling a loading platform or dock with the height of an automobile truck is the function of the Make-It-Evener loading platform.

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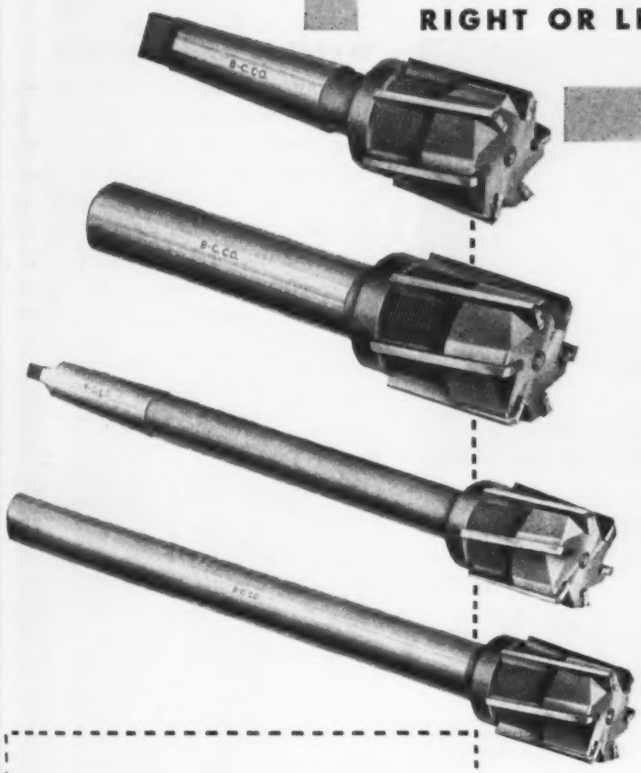
BARBER-COLMAN HEAVY-CUT *Reamers*

RIGHT OR LEFT HAND SPIRAL



FOR

- HEAVY STOCK REMOVAL
- FREE CUTTING ACTION
- CORE REAMING
- FINAL FINISHING AND SIZING

THIS NEW DESIGN OFFERS GREATER END CUTTING, STRENGTH AND BLADE SUPPORT.

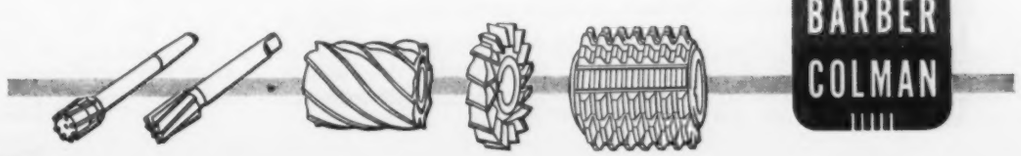
★ ★ ★ ★ ★

NEW 2° WEDGE, WITH BLADES PIN-MOUNTED IN BACK, PROVIDES CUTTING ACTION EQUIVALENT TO SOLID DESIGN.

★ Roughing, Semi-Finishing, Finishing — these new "Heavy-Cut" Reamers produce better quality holes with fewer sharpenings. The rigidity and strength, produced by the action of the 2° wedge and reverse pin mounting, is equivalent to solid design — replacement blades offer long life, and cost saving advantages. Short style, Long style, Straight or Taper Shanks and Shell types offer a wide selection to meet a variety of production requirements. Check your reaming problems with a Barber-Colman representative today. You can save money on rough, semi-finish or finish reaming by using this new line of tools.

Barber-Colman Company

GENERAL OFFICES AND PLANT, 1920 LOOMIS ST., ROCKFORD, ILLINOIS, U. S. A.



BARBER COLMAN

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NEW PRODUCTION IDEAS

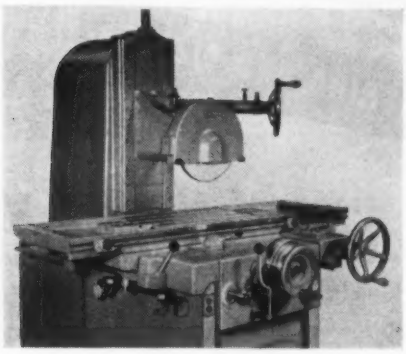
Continued

A movable platform 18 ft long x 6 ft wide is built into the loading platform like a hydraulic elevator. The inside end of the platform is held in position by a pivot, while the outer end is raised or lowered by hydraulic ram operated by electric-oil, air-oil, water or by hand. Capacity can be made to suit requirements up to 20,000 lb. *Revolvator Co.*

For more data check No. 26 on postcard, p. 35.

Surface Grinders

The first of a new series of surface grinders featuring hydraulic operation provides 12-in. cross travel with a moderate table length of 18 in. Power is supplied by a fan-cooled totally enclosed 3 hp spindle motor driving a 12-in.

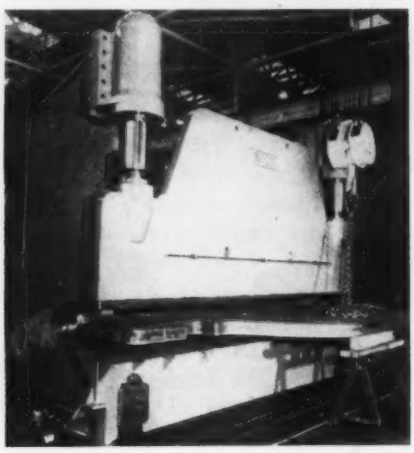


wheel. The No. 1218 Hydrabrasive has a slow speed range for crush grinding on the one extreme to fast conventional grinding on the other. Table speeds are adjustable from ½ to 90 fpm, with ⅜ in. of cross feed movement in 2/10 sec. *Abrasive Machine Tool Co.*

For more data check No. 27 on postcard, p. 35.

Hydraulic Press Brakes

Featuring streamlined appearance and operation, a new line of hydraulic press brakes bring the advantages of hydraulic operation to heavy plate work. The machines are suited for straightening and for forming to templates where the forming requires repeated strokes. Since they are hydraulically operated and cannot be overloaded, they may be safely used for bottoming work. Other advantages include the ability to deliver any predetermined tonnage up to capacity, availability of entire rated tonnage

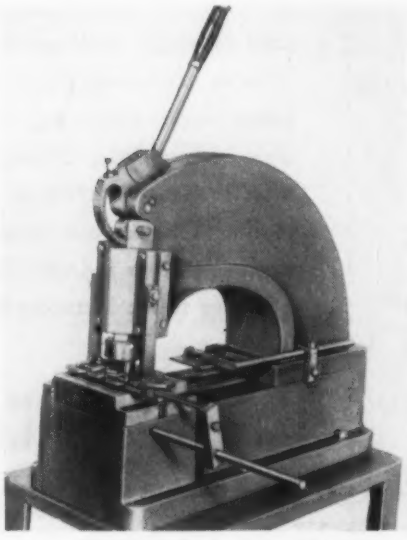


at any point during the stroke, elimination of die setting time, and ability to use all or any portion of the stroke. *Verson Allsteel Press Co.*

For more data check No. 28 on postcard, p. 35.

Punch Press

With 12-in. throat the new Di-Acro punch No. 2 can work to the center of a 24 in. wide sheet. Holes of various shapes and sizes

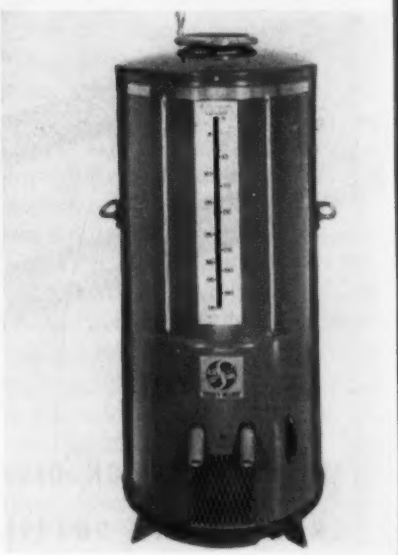


up to 4 in. diam can be perforated and a variety of blanking, drawing, embossing and forming operations can be performed. A flexible gaging arrangement built into the punch provides precision location of the material for exacting operations. A roller bearing cam of special design is said to convert a small amount of operator effort into a tremendous pressure at the point of impact. Interchangeable punches in round, square, oval and rectangular shapes are available. *O'Neil-Irwin Mfg. Co.*

For more data check No. 29 on postcard, p. 35.

Welding Transformer

Easy maintenance and operation and a welding range of 70 to 585 amp feature a new 400 amp welding transformer. Rated in accordance with NEMA specifications, 400 amp at 60 pct duty cycle, this low cost unit retains the full 75 v open circuit voltage. Fan motor and capacitors are easily accessible



for maintenance. An industrial type heavy duty motor and fan blade provide high velocity air to clean and cool the coils. *A. O. Smith Corp.*

For more data check No. 30 on postcard, p. 35.

Abrasion Wear Tester

Testing abrasion resistance of solid materials and coated surfaces is possible with the new Taber abraser that incorporates rotary rub-wear action of dual abrading wheels crisscrossing their abrasion path. The action is continuous throughout the 360° rotation of the specimen and closely parallels abrasive wear encountered in actual use. The new instrument features sturdier shafts and larger

Turn to Page 127

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Your Sandvik Representative

ASK THIS EXPERT . . .

to help you solve your spring steel problem

DO YOU HAVE YOUR COPY OF THIS FREE, NEW SANDVIK CATALOG?

Catalogues 785 sizes. Gives thickness, width, hardness, types of edges and weight in pounds per hundred feet. Also useful conversion tables. Write, on your letterhead, today.

The next time you have a problem in spring steel, call your Sandvik representative. Through experience, he has learned what the requirements of many specific spring steel applications are.

Tell him about your problem and, chances are, he can advise you as to which type of steel will best fit the job. His technical knowledge and practical experience are yours for the asking.

Furthermore, there are 785 chances that he can give you the exact type and size of steel you need, right "out of the bin." Sandvik strip steel stocks include approximately 652 cold-rolled, hardened and tempered sizes and 133 cold-rolled and bright annealed sizes.

Sandvik high quality spring steels are available:

- **In straight carbon and alloy grades**
- **In special analyses for specific applications**
- **Annealed, unannealed or hardened and tempered**
- **In thicknesses from .001"**
- **In a wide range of widths**
- **Polished bright, yellow or blue**
- **With round or square edges**

Phone, write or wire your nearest Sandvik office for further information or technical help.

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Iron Age *Introduces*

KENNETH A. SPENCER, of Kansas City, has been named a member of the board of directors of Armco Steel Corp.

HERMAN BROWN, of Houston, Tex., was elected to the board of directors of Armco Steel Corp.

HENRY L. TOLAN was appointed secretary and elected to the board of directors of Dodge Steel Co., Philadelphia.

C. C. Clymer has been appointed manager, materials handling and testing equipment division of GENERAL ELECTRIC'S industrial engineering divisions. Mr. Clymer is replacing **M. A. deFerranti,** who has been appointed assistant to **A. W. Jacobsen,** manager, parts division, aircraft gas turbine divisions.

E. N. Rickert is general service manager of KAISER-FRAZER CORP.. In his new position, Mr. Rickert succeeds **Clarke A. Silcott,** who has been appointed western sales manager.

William W. Stifler, Jr., has joined the application engineering staff of the SPRAGUE ELECTRIC CO., North Adams, Mass.

T. Clinton Fletcher becomes manager of the FISHER BODY DIV. stamping plant in Grand Rapids.

W. H. Dickson, former New York district sales manager for ALAN WOOD STEEL CO., has voluntarily retired after 41 years of continuous service.

J. W. Patrick, Jr., was elected president and a member of the board of PENN-HARRIS STEEL CO., INC.

Hamilton Merrill, vice-president and director of MANNING, MAXWELL & MOORE, INC., has been appointed vice-president in charge of the Consolidated - Ashcroft - Hancock Div. of the company.

William W. Jamieson was appointed vice-president of industrial sales and **Lewis C. Blackhall** assistant vice-president of DEARBORN CHEMICAL CO., LTD., Toronto.

Francis H. Beam was elected to the board of directors of the WEATHERHEAD CO., Cleveland.

S. P. Watkins and **P. B. Kline** are being transferred to Middletown, Ohio, as manager and assistant manager, respectively, of the stainless bar and wire sales division of ARMCO STEEL CORP. **Frank Buffo** has been appointed assistant to the manager, rustless division, in charge of production and scheduling.

Eugene C. Bauer was elected to the position of first vice-president of POOR & CO. Mr. Bauer continues in the post of president of KENSINGTON STEEL CO. of Chicago, one of the principal subsidiaries of Poor & Co.

C. Stewart Ferguson, who has been associated with GENERAL ELECTRIC CO. for 31 years as chemist, engineer and executive, was handed the technical directorship of the Marshall-Eclipse Div. of BENDIX AVIATION CORP.

John E. Miller, since 1946 assistant supervisor of the safety department at ALLIS-CHALMERS' Norwood Works, has been named supervisor of the department.

Joseph M. Beyvl has been elected a vice-president of the FOUNDRY EQUIPMENT CO., Cleveland.

Lloyd R. Loewen was appointed comptroller for the MIDVALE CO. **Francis A. Troendle's** election as treasurer and assistant secretary was also announced.

J. W. Baird's appointment as superintendent of the Annandale Limestone Mine of U. S. STEEL'S Pittsburgh Limestone Corp. at Boyers, Pa., has been announced. He succeeds **R. S. Mitchell,** who retired. **W. P. Druschel** was promoted to superintendent of the company's Buffalo Creek Mine, Worthington, Pa. He succeeds Mr. Baird in that post.

H. G. English has joined the FORD MOTOR CO.'S engineering staff as assistant to **R. F. Kohr,** research engineer. **V. J. Jandasek** has also joined the company in a similar capacity.

George Raiselis was appointed head of BASSICK CO.'S purchasing department.

I. P. Newby was appointed sales representative in the southwest Texas territory for the NATIONAL RADIATOR CO.

Roy C. Ingersoll, previously vice-president of BORG-WARNER CORP., was elected president to succeed **C. S. Davis,** president of the corporation for the past 21 years. Mr. Davis was elected to the newly created office of chairman of the board. **G. A. Shallberg,** previously executive vice-president was named chanrman of the executive committee. **A. P. Emmert** was named a vice-president.

Thomas Sproule, production manager of the Fitchburg Works of GENERAL ELECTRIC'S welding division, has been appointed assistant manager of manufacturing for the Fitchburg turbine and welding division.

George P. Eichelsbach, Jr., was elected vice-president in charge of manufacturing by the board of directors of AMERICAN STOVE CO.

Henry N. Marsh was handed a special assignment in the sales research division of HERCULES POWDER CO. **Frederick M. Hakenjos** has been appointed to the newly created post of manager of smokeless powder sales.

H. G. Irons was made manager of the real estate division of CARNEGIE-ILLINOIS STEEL CORP., while **J. O. Cook** is the new assistant manager of the division.

A. M. Tinker becomes district sales manager for the Philadelphia territory of American Chain Div., AMERICAN CHAIN & CABLE CO., INC. He succeeds **R. C. Brenizer,** who is retiring.

John R. Baush, Chester S. Roberts, Jr., and **John J. Sullivan** were elected members of the board of the DODGE STEEL CO.

Iron Age Salutes

TELL BERNA

START to talk to Tell Berna about the home life of the Eskimos and it won't be 2 min before he'll be explaining to you how living standards in the Alaskan igloo will inevitaby be improved because of machine tools.

For he is the preacher of tool gospel. His creed is "better things for more people at lower cost"—with machine tools.

He has a special text for the manufacturer. It reads "buy and save." With taxes and wages going higher while competition gets tougher, what other road to industrial salvation is left open except cutting costs by the installation of new machine tools?

This is what Tell Berna preaches to senators and office holders in Washington—to heads of metalworking companies — to churches and to schools. In fact, to every possible type of audience.

He also carries on a constant flow of services to members of his association. He describes it as "trying to do the best you can to be able to give a member the right answer to any question under the sun on a moment's notice."

Typically, he adds, "we can always give the right answer if the member will only ask the right question."

His relationship with the working press has inspired the plaudits of cub and veteran alike.

He is a bulldog in the battle for accelerated depreciation of capital equipment.

Behind this range of activities lurks the same drive that made him a 2-mile track champion at Cornell University, from which he graduated in 1912 and of which he has since served a term as trustee.

A wealth of practical experience in the metalworking and machine tools field served as a foundation for his association work. After 7 years as branch manager for Cutler-Hammer Co. in Cincinnati, he was for 7 years sales manager for G. A. Gray Co., Cincinnati, 4 years general sales manager of Union Twist Drill Co., Athol, Mass., and 7 years general sales manager of National Acme Co., Cleveland. He has been general manager of NMTBA since 1937.

"The point about Berna," a friend of his said recently, "is that he's so darned articulate. A lot of us think we know the economic philosophy of machine tools and the free enterprise system, but we don't know how to say it. Tell not only knows how, he says it, and says it again and again."

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Iron Age Introduces

Continued from Page 69

Dr. Roman Smoluchowski was named professor of metallurgical engineering at CARNEGIE INSTITUTE OF TECHNOLOGY effective Sept. 1. He joined the Carnegie Tech faculty in 1946. Earlier he had served as a research physicist with the GENERAL ELECTRIC CO.

Walter Geist has been elected to his ninth term as president of ALLIS-CHALMERS MFG. CO.

Gene D. Sickert has been named manager of the Indianapolis plant of Peerless Pumy Div., FOOD MACHINERY & CHEMICAL CORP. He succeeds **L. H. Stermer**, resigned.

Thomas B. Herndon was named development engineer of the NATIONAL SUPPLY CO.

Benedict H. Meyer is the new representative in **Iowa, Nebraska, Kansas** and western Missouri for ATLAS POWDER CO.'S industrial finishes department. **Joseph H. Harris** was appointed sales manager of the North Chicago branch of the department.

Charles Stiassni was appointed plant manager of the WHITE METAL MFG. CO., Hoboken, N. J.

Phillip Kellner is now connected with the new Brooklyn, N. Y., scrap yard of LIPSETT STEEL PRODUCTS, INC., N. Y. He was formerly with LURIA BROTHERS & CO., INC.

William R. Loughran received the appointment as general purchasing agent of FORD INTERNATIONAL.

J. F. Ingram was named chairman of the board of ING-RICH METAL PRODUCTS CO. Other officers are **E. E. Reagle**, president; **L. W. Ingram**, vice-president; **D. L. Brooks**, secretary and treasurer and **F. B. Reese**, assistant secretary and treasurer. **Edgar F. Wainwright** was appointed manager of sales.

Norm J. Kirk and **Robert Potter** were elected vice-presidents of the E. W. BLISS CO., Toledo.

Joseph E. Layton, former manager of INTERNATIONAL HARVESTER'S refrigeration division, has been added to that company's foreign operations division as assistant director of foreign operations. **Mark V. Keeler** has assumed Mr. Layton's former duties with the refrigeration division.

W. E. BOSSERT was appointed New York district sales manager for the Alan Wood Steel Co.

GEORGE P. WARDLEY, JR., has been named sales manager in the St. Louis district for U. S. Steel Products Co.

Roy D. Beck was named manager, ceramic division, of the BINKS MFG. CO., Chicago.

Philip J. Carragher joined the sales staff of FERRO ENAMEL CORP., Cleveland.

E. W. Connolly has been appointed sales manager of the Detroit district of Haynes Stellite Div., UNION CARBIDE & CARBON CORP. He succeeds **R. D. Gunther**, who retired.

Blake C. Hooper was appointed to the sales staff of P. W. VOSS & ASSOCIATES, Chicago.

Theodore G. Hughes was handed the assignment of general manager of all manufacturing operations of DAYSTROM CORP.'S plants at Olean and Friendship, N. Y.

George Copeland has been named a member of the sales staff of the Coatesville district sales office of LUKENS STEEL CO. His post as office supervisor, Philadelphia district sales office, will be filled by **Albert Sardella**, assistant office supervisor.

Clair C. Finley was made chief draftsman of the engineering department at the Midland Works of CRUCIBLE STEEL CO. He succeeds **L. G. Pearce**, who retired after 24 years with the company.

Charles Edison, president of THOMAS A. EDISON, INC., was elected to the newly created position of chairman of the board of directors. **Henry G. Riter 3rd** was elected to succeed Mr. Edison as president.

OBITUARIES

Guy S. Hyatt, department comptroller of General Electric Co.'s apparatus department, died recently. He was 46 years old.

W. H. Weaver, 56, superintendent of industrial relations at Fairfield Steel Works for the Tennessee Coal Iron & Rail Co., Birmingham, died May 1.

Albert J. Lent, general superintendent of United States Graphite Co., Saginaw, Mich., died recently.

William A. Schreiner, former vice-president of Malloy & Schreiner, Inc., passed away May 3.

Brig. Gen. Charles L. Fike, U. S. Marine Corps Ret., died in an auto accident near Philadelphia on May 3. Mr. Fike has served for the past three years as executive engineer of the Budd Co.

A. C. Streamer, formerly vice-president in charge of Westinghouse Electric Corp.'s East Pittsburgh Works, died on May 4.

Robert Case Bennett, Sr., president of I. A. Bennett & Co., passed away in Chicago on May 1.

Simon S. Duff, 72, veteran demolition expert and general manager of Swift-McNutt, died May 2 in Boston.

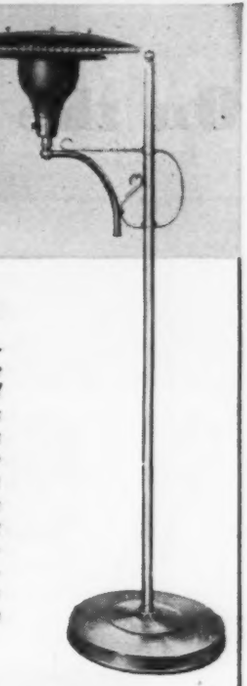
L. D. Holland, assistant to the president and a member of the board of directors of E. F. Houghton & Co., passed away recently. He was 46.

Wilbur F. Pray, New York district sales manager of Askania Regulator Co., died recently.

Irving H. Reynolds, 88, retired Allis-Chalmers executive, died recently in Milwaukee.

Sight-Light FLOOR LAMP *Sub-Assemblies*

NOW TURNED OUT 3 TIMES AS FAST



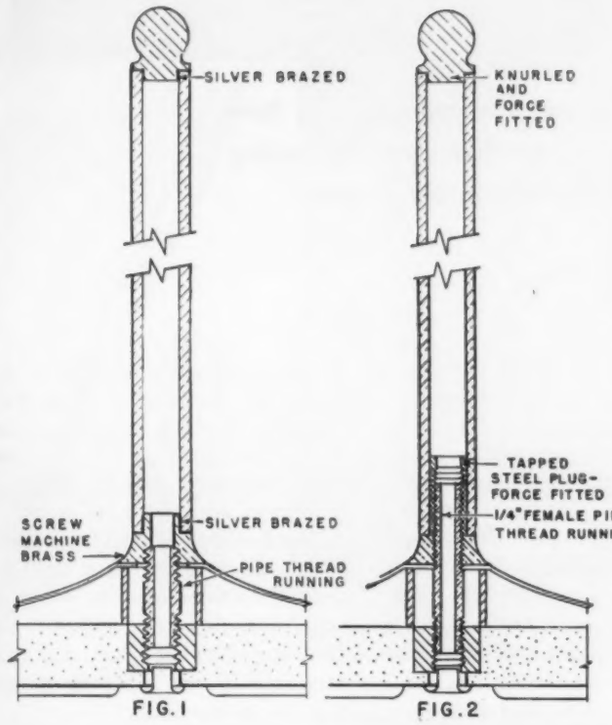


FIG. 1

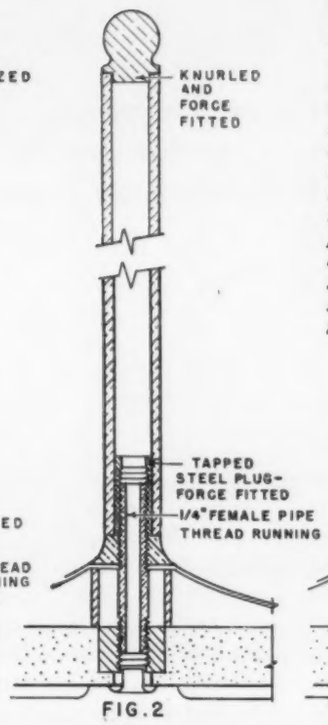


FIG. 2

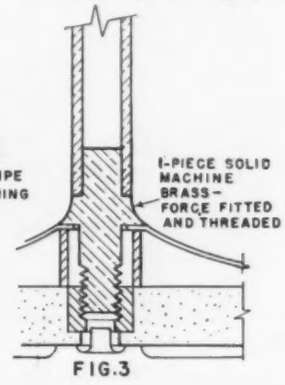


FIG. 3

HERE'S HOW IT WAS DONE

Fig. 1 shows the two spots that formerly were silver brazed, and the screw machine brass piece that joined the stem with the base. Fig. 2 shows how top knob and machined brass section that joins the stem with the base are force fitted, eliminating 2 brazing and finishing operations, thus strengthening the lamp and making possible faster assembly and disassembly. Fig. 3 shows base construction simplified even further . . . single screw machine part in the base does the work of three separate parts.

Lamp stem is Revere ¾" O.D. x .680"—.6835" I.D. 70-30 brass tube hard drawn. Support bracket is ⅛" x 1¼" Revere Brass Strip while the outside floor base spun shell is made from 12" wide x .0253 Revere Brass. Screw machine parts at top and base of lamp are Revere 240 type screw machine rod.

Joint efforts of Revere and Plainville Metal Works resulted in elimination of 2 silver brazing and finishing operations . . . faster assembly.

IN working with manufacturers on their various problems, Revere not only takes into consideration how its products can be used to help solve these problems, it also delves into the production methods employed. As a result there have been many cases where Revere and the manufacturer have collaborated to work out new production methods that have not only produced a better product but have also cut production costs.

Newest example of this is the manner in which Revere collaborated with the Plainville Metal Works, Plainville, Conn., in developing the Sight-Light patented reading lamp which they manufacture for the Sight-Light Corp., Deep River, Conn. Originally the knob at the top of the lamp stem was silver-brazed in. Revere suggested this could be a force fit.

Formerly, there had been a screw-machine brass trim section at the base of the lamp stem which had a shoulder on it that was also silver-brazed into the tube. A ¼" running pipe thread nipple with an unthreaded section anchored this screw machine part to the weighted base which was covered by a spun brass disc.

The engineers at the Plainville Metal Works tried various ideas to improve this construction. The final result was a machined section of solid brass that is joined to the lamp stem with a force fit, while the opposite end of this section is threaded for fastening to the base.

Results: 1. Elimination of two silver brazes. **2.** Elimination of two finishing operations, one of which was acid cleaning, and the other, the removal by hand of the discoloration caused by the acid cleaning. **3.** Subassemblies turned out 3 times as fast through a new, faster assembly method that permits finishing before assembly on a mass production basis instead of by hand. **4.** A substantially stronger lamp. **5.** A trim, one-piece screw-machine part at the base that is turned out faster and in a single machine set-up.

Perhaps Revere can be of help in developing or improving your product—cutting your production costs. Why not tell Revere *your* metal problems? Call the Revere Sales Office nearest you today.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

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Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere.

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On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Chevrolet plans to double Powerglide capacity . . . Now using precision production . . . Kaiser-Frazer cuts tooling time with new dies . . . Higher tire prices on way.

By WALTER G. PATTON

Powerglide Expansion — Chevrolet has decided to double the capacity of its Powerglide automatic transmission facilities. That the decision was reached only a little more than a month after output at the Cleveland plant reached its rated capacity of 60 per hr is significant. Public insistence on automatic driving is building up.

Biggest expansion will be at Cleveland where the Powerglide is assembled. No new construction is involved but new tooling will be need to double the present output of 1000 per day. Other Chevrolet plants which will need new equipment are located at Flint, Detroit, Saginaw, Bay City, Buffalo and Toledo.

New Goal—During a visit by the press to the Cleveland plant last week, T. H. Keating, general manager of the Chevrolet Motor Div. announced that the new production objective is 2000 per day. Chevrolet hopes to reach it before the end of the year.

Up to the present time, the Cleveland plant has assembled more than 70,000 automatic transmissions. Projected Chevrolet schedules and anticipated volume during the final months of 1950 add up to 2 million cars and trucks. This compares with 1,493,500 units assembled during 1949, an increase for the year of 34 pct.

DeLuxe Outsells—At the present time, Chevrolet production is at an all-time high, reaching 8431 passenger cars and trucks in a single day. The company's present production is three passenger cars for every truck. Its DeLuxe car models are outselling standard models by about the same ratio.

While Keating intimated that the company will not be too surprised to see 65 to 70 pct of its DeLuxe cars equipped with Powerglide, the projected capacity of 2000 Powerglides per day would equip less than half of the present DeLuxe volume.

Problems Reviewed — During the press conference, Keating reviewed some of the problems that had to be considered in Chevrolet's Powerglide program. While automatic drives were being sold by other GM divisions in other price classes to 80 to 90 pct of the buyers, it was recognized that the times were unusual. Fleet users, and Federal, State and Local governmental agencies will probably continue to order standard models. As a competitor in the low price field, Chevrolet has to move cautiously in adding to its costs.

The decision to build the Powerglide was made 2 years ago. Last week Chevrolet was, in effect, not only doubling its capacity but doubling its bet that automatic driving will find a strong place in the low price field.

To Be or Not to Be — If it follows tradition, the company could conceivably make an automatic transmission standard equipment when more than half the buyers order Powerglide. Keating admitted that any such decision, if it is ever made, was in the future.

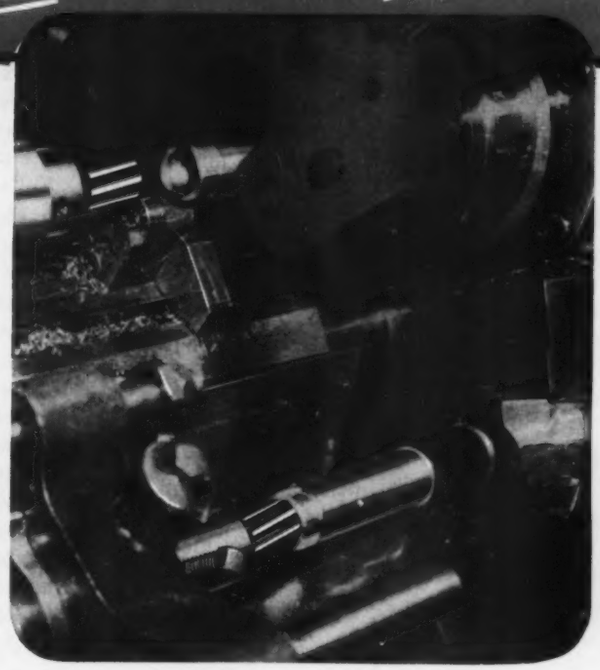
He also indicated that the geographical distribution pattern for automatic drives is somewhat indefinite and that the company will have to take a good look at all the factors involved before any decision is taken to make Powerglide standard on Chevrolet.

Myriad Operations — Approximately 500 separate operations are involved in assembling a Powerglide transmission. Tolerances equal where they do not exceed those of most auto parts, including engines. All mating surfaces are precision ground or lapped. Both static and dynamic balancing is employed.

At a number of locations the

Call PRATT & WHITNEY

FOR A *Better* CUTTING TOOL TO DO A *Better* JOB



PRATT & WHITNEY MODIFIED SPIRAL POINT BOTTOMING TAP

PRATT & WHITNEY STUB SCREW MACHINE REAMERS

PRATT & WHITNEY DUOCONE DIES

PRATT & WHITNEY STRAIGHT SHANK BLUE HELIX REAMERS

PRATT & WHITNEY T-CUT BLADE

PRATT & WHITNEY JOHNSON'S CUTTING-OFF TOOL

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necessary tolerances are achieved only by grading production and precision fitting the parts according to size, just as pistons and cylinder bores, for example, are matched in assembling auto engines.

All castings used on the job are normalized in a continuous furnace. Sand is removed in a salt bath designed especially for the purpose. One transfer machine has 15 stations and operates 89 cutting tools, including drills, reamers, facers, etc.

Simplicity Feature— Chevrolet engineers say the Powerglide is the least complicated design in the industry. The present Powerglide was selected from five original designs. Six different models were built before the transmission went into production.

Since then, Chevrolet engineers and manufacturing experts have made further changes to simplify production while assuring that top quality will be maintained. To many who have always watched Chevrolet manufacturing methods with envy, the Powerglide operation is undoubtedly Chevrolet at its best.

Precision Production—The facilities Chevrolet is using at Cleveland to produce the Powerglide occupy more than 150,000 sq ft. Of the 350 major pieces of equipment in use, more than a third are precision tools of the latest and most modern design.

Inspection requirements are unusually rigid. Every major part or assembly is tested on a special testing machine. A separate gear laboratory spot checks the involute form, helical angle and tooth spacing of gears.

Plastic Molds — Kaiser-Frazer engineers have brought the new light car to be introduced this summer into production in record time. The body design was not finalized until last October, and 4 to 5 months of tooling time were gained by using a new method to produce dies for the new cars.

The new K-F technique involves the use of plastic to produce a female mold. Plaster models are then made from this mold and these are used in the Kellering operation which produces steel stamping dies.

Kish and Kaiser — The usual technique is to produce wood models from which templates are made. These templates are used in making engineering drawings. Under the K-F scheme, the templates are made at the same time the dies are being produced on the Kellering machine.

The new plastic method was developed over the past several years by K-F engineers working in conjunction with Kish Plastic Co., Lansing, Mich. The process was first used in making large model body panels for previous Kaiser and Frazer cars.

This is the first time the technique has been used on an entire body. In addition to saving time, K-F engineers contend that body contours can be produced more accurately using plastics than is possible with the conventional method of fashioning body dies.

Tire Price Inflation — Higher tire prices are coming. At a press conference here this week, Harry E. Humphreys, Jr., president of U. S. Rubber Co., said that in less than 4 months the price of natural rubber had jumped more than 40 pct.

On June 27, Humphreys said, the price was 18½¢ in New York. The recent high was 26½¢. According to Humphreys, at the present time about two-thirds of all rubber used in transportation today is the more expensive natural rubber. Only about one-third is the synthetic product.

In issuing his warning about higher tire prices, Humphreys pointed out that present tire prices are only 6 pct above the prewar figures. He estimated the industry will sell more than 82 million tires this year, including the original equipment and replacements. The projected increase is about 2 million over last year's total and includes passenger cars, trucks, buses, farm vehicles and airplanes.

THE BULL OF THE WOODS — By J. R. Williams

WILL YOU LET ME KNOW BEFORE NEXT FRIDAY? UH, SHOULD I PUT IT DOWN ON PAPER—UH—IN INK?
NO, NO—I'LL LET YOU KNOW!
YOU CAN EASY TELL THAT GUY'S HAD SOME SAD EXPERIENCES WITH BOSSES WHO DON'T MAKE NOTES!
YEH, AND YOU CAN TELL TH' BULL'S HAD SOME SAD EXPERIENCES WITH GUYS HE DID TAKE NOTES FOR!
5-19
J.R.WILLIAMS
THE DIPLOMATS
T. M. REG. U. S. PAT. OFF.
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WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity—By R. T. REINHARDT

Jobber Business Brisk — Western steel warehousemen generally report business conditions better now than for the past several months with strong demand for almost all steel items they can put into stock. Prices remain firm although some price reductions by small jobbers have been noted in southern California.

Only explanation for these cuts in the face of heavy demand appears to be excessive inventories on a few products in the hands of small operators. As elsewhere, steel sheets are in short supply on the Coast with some jobbers complaining that assigned mill quotas are not being filled. Even bars and structurals, moving slowly a month ago, are now in good demand, with alloys and stainless steel strong.

Is This the Answer? — Unconfirmed reports in the Salt Lake City area to the effect that another important expansion is in the cards for U. S. Steel's Geneva plant have given rise to the speculation that this development may tie in with the delay of installation of the cold reduction mill at Los Angeles announced by Columbia Steel Co. more than two years ago. (THE IRON AGE, May 11, 1950, p. 58.)

According to rumors, the company has under consideration installation of facilities for production of either hot or cold rolled sheets. The mill is now supplying hot rolled strip to the Pittsburg plant of Columbia for cold reduction there. Geneva is currently operating at the highest rate in its history — slightly more than 105 pct of rated capacity.

Smog Clearing — Los Angelenos now breathe air 25 pct cleaner than they did 2 years ago, according to Gordon Larson, head of the Los Angeles County Air Pollution Control Board. He states that the battle to eliminate smog entirely is being won and reported to the American Society of Civil Engineers recently that oil and chemical industries have spent more than $3 million to shrink their smog output.

Non-ferrous foundries and producers of steel in electric furnaces have been successful in their control efforts although gray iron foundries are still having difficulties. Foundrymen are awaiting a report from an inspection of eastern smog control facilities made by members of their investigating committee as they face the May 22nd deadline set by the control board for a solution.

A crisis may develop if foundries have not signed contracts for corrective equipment by that time and smog officials state that they "mean business."

Seattle Looking Up — Steel demand is improving in the Pacific Northwest to the point where Bethlehem Pacific Coast Steel Corp. is considering operation of a third furnace within a month.

Bethlehem Pacific expects to have its new fabrication plant ready for production by mid-June and almost all machinery is now in location and ready for installation. Pacific Car & Foundry Co. has already started fabrication in its new Seattle plant.

More Public Construction — Public construction in the Los Angeles area is filling the gap in the building industry and pushing totals to new records, with estimates that it will account for 30 pct of the total building this year.

Last year the figure was 27 pct and in 1946 it was 21 pct. Private construction has declined slightly in the past two years. More money is spent on public highways than on anything else and before the war accounted for about half the total. The estimate for 1950 is 31 pct.

New Intermountain Plants — Filtrol Corp., Los Angeles manufacturer of catalytic agents for the oil refining industry, is investigating Intermountain sites for a new $2,500,000 plant. Among those under consideration are Eureka, Utah, Henderson, Nev., and Industrial Center west of Salt Lake City.

Raw material for the proposed new plant—hallosyte clay—will be obtained from the Dragon Consolidated Mines Co. at Eureka. Lockheed Aircraft Corp. is also reportedly looking around for a plane plant site in the same area.

House Divided — Sponsors of the revived metal mining incentive bill, which would provide $330 million to encourage development of nonferrous metal ores, are again encountering intra-industry troubles. According to Rep. Walter K. Granger (D., Utah) some of the mining people are quietly opposing the proposed legislation and recommending tariff boosts instead.

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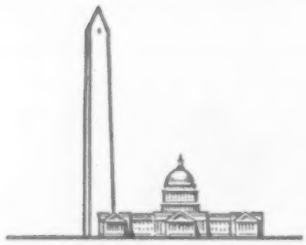

THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

Dangerous Unemployment — The critical stage will be reached when 6 million are out of work, is now the unofficial view of the Bureau of Labor Statistics. Earlier danger point was 5 million, which might be reached within the next month or so when school graduates enter the job market.

There was a further pick-up in employment between March and April to a total of 58.7 million jobs. Unemployment again declined sharply in April to 3.5 million from the 4.1 million recorded in March. Unemployment is still about 500,000 greater than a year ago.

Public Works Pushed—Behind-the-scenes agitation is being renewed for a big public works program. Some government officials say the expected 1950 construction high of $20 billion is not enough, that it should be $25 billion—or 10 pct of the national income. Hints are tossed about that unless private contractors see the light and step into the breach, the government must and will increase its present building rate of $6 billion at least by half.

Foreign Trade—The Administration appears headed for defeat on two of its major foreign trade recommendations—membership in the International Trade Organization and the Customs Simplification Act.

The ITO, establishing a so-called "fair trade" code for international trade, is opposed on the grounds that it will place American foreign trade policies, including the setting of tariffs, under the supervision of foreign nations whose primary interest is protection of their own industries. The Customs Simplification Act is designed to cut away a lot of the red tape surrounding import trade. It is estimated the passage of this legislation would increase U. S. imports by $1 billion annually.

Seaway Shelved—The St. Lawrence Seaway is a dead issue for the remainder of 1950. The House Public Works Committee has voted to delay action on the project until after the Senate acts. This is buck-passing, for the Senate has no plans to consider the enabling legislation until at least next year.

Council Filled—President Truman has rounded out the membership of his three-man Council of Economic Advisers and in so doing has given it a complete Fair Deal cast. Leon H. Keyserling, a New Dealer, has been made chairman, succeeding Edwin C. Nourse.

The new member is Roy Blough, Chicago University economist and former Treasury official, whose Fair Deal philosophy is a matter of record. The other member, John D. Clark, a liberal but not as far left as his colleagues, has been made vice-chairman.

The Council will go down the line for the Fair Deal program, rather than maintain an independent economic position as had been the case under the leadership of Dr. Nourse.

Funds for Planes?— A Senate committee is weighing an Administration proposal that the government embark on a $12.5 million program of testing new types of planes developed by private industry. The Defense and Commerce Depts. are urging such a 5-year plan to develop three principal types of aircraft—jet passenger transports, large-capacity cargo planes, and small passenger planes for "feeder" lines.

Reorganization Plans — Congress is likely to look with favor on the President's proposal to transfer the Reconstruction Finance Corporation, except its housing activities which will go to the Housing and Home Finance Agency, to the Commerce Dept.

Many legislators have been anxious to liquidate the RFC and the agency is being investigated by the Senate Banking Committee. This transfer is part of the President's program to center both financial and non-financial services to business within one department. Top Commerce officials told THE IRON AGE that if the transfer goes through the RFC would eventually be liquidated.

Ammonia Saves Money

IN ATMOSPHERE ANNEALING

Substantial savings can be realized by using a 75 pct hydrogen—25 pct nitrogen mixture for annealing electric metals. The atmosphere is produced in an ammonia dissociator, eliminating storage and handling required with cylinder hydrogen. Initial investment can be recovered in less than a year by the direct savings.

By L. H. SEABRIGHT,
Metallurgical Engineer,
Vulcan Stamping & Mfg. Co.,
Bellwood, Ill.

and

N. K. KOEBEL,
Director of Research,
Lindberg Engineering Co.,
Chicago

PURE hydrogen has been universally considered the best atmosphere for producing ultimate properties during annealing of electric metals. The source of such hydrogen has always been from standard commercial 2200 psi cylinders containing approximately 220 cu ft gas at standard temperature and pressure conditions. Commercial cylinder hydrogen conveniently serves small furnaces where the consumption of hydrogen is small. In plants where consumption is greater, the high cost of cylinder hydrogen, coupled with the problems of handling and storage, is quite a factor in the cost of annealing metals used in electrical equipment.

From a theoretical point of view, a 75 pct hydrogen-25 pct nitrogen produced from dissociated ammonia should be a suitable atmosphere to produce the desired electrical properties during annealing. From an economic point of view, there have never been any doubts about using a 75 pct hydrogen-25 pct nitrogen mixture obtained from cracking ammonia. However, there has always been a cloud of doubt as to whether suitable electrical properties can be obtained with a mixture of hydrogen and nitrogen gases.

A 75 pct hydrogen-25 pct nitrogen atmosphere is produced by completely dissociating anhydrous ammonia into its components of hydrogen and nitrogen by passing the raw ammonia over a heated catalyst. No air is used in the dissocia-

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ting or cracking process, and since the ammonia used is anhydrous, the resulting 75 pct hydrogen-25 pct nitrogen mixture is free from any traces of oxygen or water vapor. The dew point of the cracked gas measures from —40° to —60°F (0.0188 to 0.0056 pct water) which is considered bone dry. The raw, anhydrous ammonia is supplied from cylinders or from tank car storage facilities.

The liquid ammonia flows into the heat interchanger or vaporizer (see Fig. 1), where it is vaporized into gaseous ammonia. The high-pressure gaseous ammonia is reduced to about 10 psi by the pressure expansion valve. The resulting low-pressure ammonia gas passes through the safety shut-off solenoid valve into the catalytic chamber, which is externally heated to 1750°F.

The hot dissociated ammonia then passes through the heat interchanger where it gives up its heat to vaporize the raw incoming ammonia. The dissociated ammonia atmosphere finally passes through the flowmeter on the control panel and the pressure is reduced to the desired operating pressure.

Operation Is Simple

Operation of the ammonia dissociator generator is simple. The operator connects several 150-lb cylinders of anhydrous ammonia to the supply manifold. One cylinder is drained while the other is used for standby operation. Alarm signals can be installed on the manifold to warn the operator when it is necessary to cut in the standby cylinder and replace the empty. When tank car ammonia supply is used, the operation of changing cylinders is completely eliminated. When the catalytic chamber reaches 1750°F, the protective atmosphere is immediately available for use. Once the generator is started, the operation is fully automatic.

In the selection of an ammonia dissociator to produce a hydrogen atmosphere acceptable for annealing electric metals, several design factors must be met and should be taken into consideration. The most important is that the generator dissociate the ammonia 99.95 pct or better at its maximum rated output. The resulting hydrogen-nitrogen mixture should not contain more than 0.05 pct raw ammonia.

High residue traces of raw ammonia may cause nitriding on the electric metals during the slow cooling cycle through a range of 800° to 1200°F. The maximum percent of raw ammonia permissible without causing nitriding or affecting the electrical properties has not been established. The results of the test work reported in this article are on the basis of using dissociated ammonia with 0.05 pct max raw ammonia. No nitriding or changes in surface chemistry of the

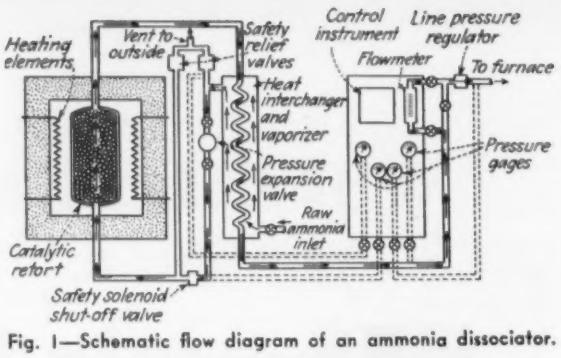

Fig. 1—Schematic flow diagram of an ammonia dissociator.

electric metals treated could be detected.

The initial cost of a generator guaranteed to dissociate ammonia 99.95 pct or better at its full rated output is considerably higher than one producing at 99.50 pct. The reason for this is that 1½ times the catalytic surface area is needed to reduce the traces of raw ammonia from 0.50 to 0.05 pct.

The catalyst must also be of a permanent type that will not lose its efficiency or disintegrate over a period of time. Pure nickel shot has been found to be the ideal catalyst in this respect. Since a considerable amount of nickel shot is required to fill a retort as compared to the refractory nickel impregnated type of catalytic rings, this construction again raises the initial cost but is well worth the difference in the case where a high purity gas is required.

Another important engineering feature that should be considered is the type of heat interchanger and vaporizer built into the ammonia dissociator. A well-designed unit should have an

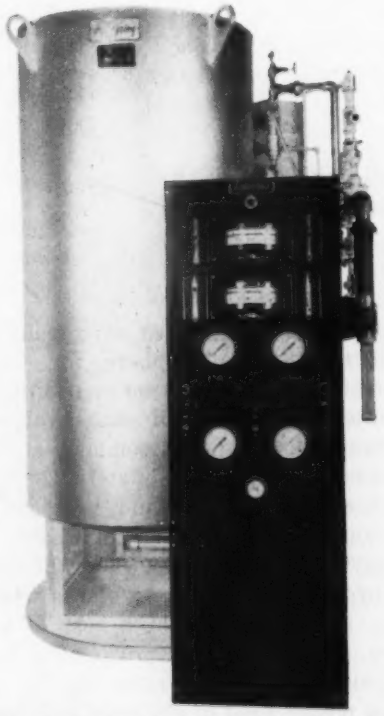

Fig. 2—Front view showing control panel of 1500 cfh capacity Lindberg Hyam ammonia dissociator.

electrically heated and fully automatically controlled vaporizer for start-up purposes. After the unit has been started and there is sufficient hot gas from the dissociator to supply the necessary heat through the heat interchanger to the vaporizer, the electrical energy will automatically shut off. Controls are provided to control the vaporizer at definite temperature.

In the event the dissociator is operating at a low output and there is insufficient heat from the dissociated gas for vaporization, the electrically heated vaporizer will automatically take over. Without this feature it is very difficult to start up the dissociator without having the liquid ammonia flood over into the expansion valve. Not only does this create a nuisance problem, but also endangers the catalyst by flooding accumulated oil in the vaporizer over into the catalytic chamber. Oil will coke the catalyst and greatly impair its efficiency. If too much oil is flooded over, the catalytic chamber may become clogged and permanently damaged.

Economic Advantages

The ammonia dissociator, shown in Fig. 2, is an economical means of producing dry hydrogen. When using cylinder ammonia at a cost of 16¢ per lb, the resulting cost of the 75 pct hydrogen-25 pct nitrogen mixture including the cost of operating the dissociator based on electric power at 1¢ per kw-hr is $4 per 1000 cu ft. With tank car ammonia at a cost of 7¢ per lb, the cost of the atmosphere is about $2 per 1000 cu ft. On the other hand, the cost of cylinder hydrogen is about $10 per 1000 cu ft.

One pound of liquid ammonia produces about 45 cut ft of 75 pct hydrogen-25 pct nitrogen atmosphere. Thus, 22.5 lb of liquid ammonia are required to produce 1000 cu ft of gas. A 150-lb cylinder of anhydrous ammonia will produce 6750 cu ft of bone dry hydrogen-nitrogen mixture at a cost of about $27. To obtain an equivalent volume of gas, 31 standard cylinders of commercial hydrogen containing about 220 cu ft each would be required at a total cost of about $68.

In addition to the high initial cost of the cylinder hydrogen, 30 more cylinders must be transported, handled and connected to produce the same volume of gas. The extra labor for handling cylinders becomes quite a cost factor and is usually overlooked because it is hidden in the overhead figure. The space required for a manifold bank of hydrogen cylinders with space for standby cylinders usually runs from four to ten times as great as the entire space required for an ammonia dissociator and ammonia cylinders. If space is at a premium, this results in another indirect saving.

From a safety point of view, the handling of low pressure ammonia cylinders is much safer than handling high pressure hydrogen cylinders. Since only a few ammonia cylinders are handled for a same volume of gas as compared to hydrogen cylinders, there is less chance of any accidents. An ammonia dissociator generator is considered just as safe as any other type of furnace atmosphere generator.

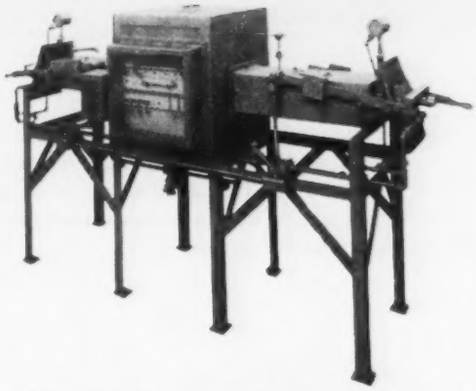

Fig. 3—Lindberg full alloy muffle, hand pusher type furnace, with attached water-jacketed cooling chamber, for annealing light production loads of electric metals.

Another definite advantage of the hydrogen-nitrogen mixture obtained from dissociated ammonia is that it is free from traces of oxygen and water vapor. Since small traces of oxygen exist in cylinder hydrogen, the moisture content will increase in the furnace if these traces are not removed.

Some manufacturers of electric relays and similar parts purify and dry cylinder hydrogen for the high alloy types of electric metals, such as Permalloy with nickel content of 30 to 90 pct plus chromium or molybdenum, Nicaloi with nickel content of 49 pct, and Mumetal with nickel content of 76 pct. No advantage can be obtained from purification and drying of cylinder hydrogen for the Armco irons or silicon steels, provided the gas is reasonably pure.

Although these savings are quite impressive, many shy away from generating hydrogen from dissociated ammonia on the basis that their usage does not warrant the initial investment. At first glance, the initial cost of the equipment seems high, but an analysis of the direct savings shows that an ammonia dissociator can be paid for within a year on a 40-hr week.

Furnace Equipment

Furnace equipment required for hydrogen atmospheres must be of the alloy full muffle type to conserve on the amount of hydrogen used and prevent the hydrogen from becoming contaminated from furnace refractories or infiltration of air. Another general requirement is that means be provided to cool the charge of work in the hydrogen atmosphere below a temperature of 200°F to prevent scaling or discoloration.

One of the most common types of furnaces to meet these requirements, when the production load is light, is the full muffle hand pusher furnace with an attached water-cooled chamber as shown in Fig. 3. The work is placed on trays or

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baskets and charged into the furnace. After the work is permitted to cool slowly in the furnace to 800°F, the load can be cooled at a faster rate to room temperature in the water-cooled jacket while another load is heating.

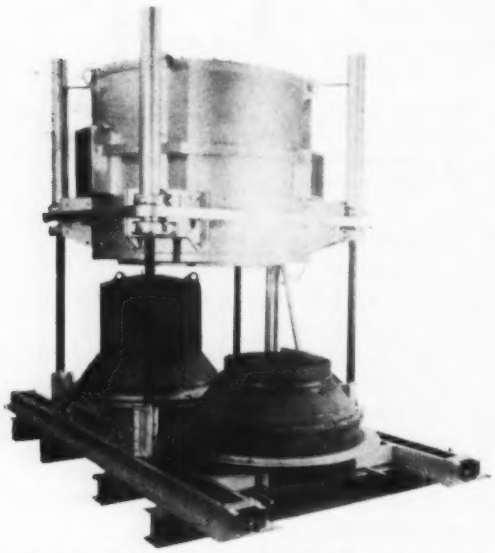

Fig. 4—Lindberg bell-type annealing furnace for annealing heavy production loads of electric metals. The unit has a self-contained track and lifting device for placing furnace over bells.

Another popular furnace for light production annealing of electric metals requiring slow cooling rates is the double horizontal retort furnace. While one load of work is being heated and slow-cooled to 800°F in the furnace, the previous load is cooled to room temperature and removed. Another load of work is charged into the cold retort, the air is purged with hydrogen and the retort is ready to go into the furnace when the previous load has slow-cooled to temperature.

If the production loads are heavy, the bell annealing furnace as shown in Fig. 4 can be used. In this case the furnace is moved and placed over the bells to meet the heating, slow cooling, fast cooling, purge and loading cycles. Another variation of this type of furnace is the vertical retort type. In this case the furnace stays stationary and the retort containing the load is moved through the various cycles.

Comparative tests were run on materials annealed in both hydrogen and dissociated ammonia. The material used in preparing the iron samples was essentially Armco magnetic iron, purchased to the following maximum specifications: C, 0.04; Mn, 0.20; P, 0.05; S, 0.05; Si, 0.10; Cu, 0.075; Al, 0.30 and other 0.15.

Permeability results as determined on a Fahey permeameter (Standard Methods of Test for Magnetic Properties of Iron and Steel ASTM Designation: A34) are shown in Table I both for sealed pot annealing and for annealing in atmospheres of hydrogen and dissociated ammonia on 10½ in. long specimens. The annealing cycle consisted of heating the work to 1800°F and holding at this temperature until thoroughly soaked. Furnace heat is then turned off and the work allowed to cool in the furnace at about 100°F per hr.

For high permeability and low hysteresis loss, the carbon content should be low, and sulfur and phosphorus content are generally considered harmful. Therefore any treatment that will decrease the amounts of these elements present will improve the characteristics of a magnetic alloy.

The results obtained justify the popularity of hydrogen annealing for magnetic core materials, since the hydrogen reacts with and removes the major percentage of the impurities such as carbon, sulfur and phosphorus. The comparative tests with parts annealed in dissociated ammonia show them to be slightly inferior to the samples annealed in hydrogen, but well within the specified limits for direct-current properties.

Further tests were run to determine magnetic performance for comparison by means of an open search coil into which an annealed core is inserted. The particular coil for these ⅜ in. cores was made from 8250 turns of No. 33 enameled copper wire, wound around a hollow core. This coil is inserted in the test fixture in an inductance bridge, 2 v applied, and the additional inductance measured at 900 cycles. A minimum value of 1.5 Henries was established for the cores tested.

The results of these tests using the search coil and the inductance bridge at 900 cycles, shown in Table II, indicate that the cores annealed in dissociated ammonia are slightly superior to those annealed in hydrogen. The slight difference, however, is scarcely enough to be significant.

TABLE I

COMPARISON OF ANNEALING METHODS FOR ELECTRIC METALS

	Unannealed	Annealed in Sealed Pot	Annealed in Hydrogen	Annealed in Dis. Ammonia	Required
Bm, (Max. Flux Density)	18,000	15,000	14,600	14,200	13,500 Min
Br, (Residual Induction	8535	4800	8400	7900	8000 Max
Hc, (Coercive Force)	3.0	1.12	0.4	0.6	1.0 Max
Hardness, Rb	80	29	12	7	25 Max

TABLE II

INDUCTANCE OF MAGNETIC CORE MATERIALS*

Core Number	Before Annealing	After Hydrogen Annealing	After Electroplating	Before Annealing	After Annealing in Dissociated Ammonia	After Electroplating
1	1.20	1.83	1.70	1.21	1.84	1.76
2	1.28	1.76	1.63	1.21	1.87	1.73
3	1.24	1.81	1.67	1.23	1.86	1.74
4	1.24	1.81	1.68	1.24	1.88	1.75
5	1.20	1.78	1.64	1.20	1.88	1.73
6	1.20	1.80	1.66	1.21	1.89	1.79
7	1.21	1.78	1.63	1.21	1.87	1.77
8	1.20	1.81	1.67	1.21	1.86	1.75
9	1.21	1.76	1.62	1.24	1.85	1.79
10	1.22	1.84	1.70	1.24	1.92	1.76
11	1.21	1.78	1.64	1.22	1.96	1.77
12	1.20	1.76	1.62	1.24	1.85	1.72
13	1.24	1.77	1.62	1.25	1.89	1.72
14	1.22	1.78	1.64	1.22	1.90	1.74
15	1.21	1.75	1.61	1.23	1.88	1.75
16	1.21	1.79	1.66	1.21	1.90	1.76
17	1.22	1.78	1.63	1.20	1.87	1.73
18	1.21	1.72	1.66	1.21	1.90	1.75
19	1.27	1.83	1.68	1.21	1.90	1.79
20	1.21	1.82	1.67	1.23	1.91	1.77
21	1.23	1.77	1.63	1.21	1.90	1.77
22	1.22	1.78	1.64	1.21	1.87	1.73
23	1.25	1.76	1.62	1.20	1.87	1.74
24	1.24	1.82	1.68	1.22	1.82	1.73
Average	1.22	1.78	1.66	1.22	1.88	1.75

* Results are given in Henries.

Because of its low electrical resistance, the eddy current losses are very large when magnetic iron is subjected to alternating-currents. These losses increase substantially after the parts are placed in use. Reannealing of the core material after a period of service only gave temporary relief. Aging, as this characteristic has been referred to, manifests itself as an increase in hysteresis loss and a decrease in permeability with time, under normal operating conditions. The addition of a small percentage of silicon to iron largely eliminates the aging tendency. This seems to be due to the fact that the addition of silicon promotes grain growth in iron and increases the electrical resistivity.

TABLE III

MAGNETIC PROPERTIES OF 1 PCT SILICON ALLOY*

	From 200 Oersteds		
	Bm	Br	Hc
Annealed in Dis. NH_3	19,400	7800	0.9
Annealed in Hydrogen	19,200	8400	0.6
Requirement	17,500 Min	9000 Max	1.0 Max

* 2SS Relay Steel, ¼ in. diam rod.

Hydrogen annealing has generally been used for obtaining the optimum magnetic properties from iron-silicon alloys. In order to determine the effect of dissociated ammonia on the annealing of iron-silicon alloy, samples of ¼ in. diam 2SS relay steel and 29 gage silicon sheet steel were annealed at 1650°F in this atmosphere and the magnetic results compared with similar samples which had been annealed in hydrogen. The results are shown in Tables III and IV. These permeability tests were run on a Fahey permeameter as were those in Table V, below.

One of the most common nickel-iron alloys is the 47 pct nickel alloy referred to as Allegheny 4750. It does not require such exacting heat treatment as the higher nickel alloys, nor is it so affected by mechanical strains; also, its saturation density is higher. This alloy has a very low coercive intensity and small hysteresis loss. The main use of this metal at present is for the cores of high-quality audio frequency transformers and chokes. To determine the effect of dissociated ammonia on annealing these alloys, samples of strip were annealed at 1850°F and the magnetic results compared with similar samples which had been annealed in hydrogen.

TABLE IV

MAGNETIC PROPERTIES OF 4 PCT SILICON ALLOY*

	From 200 Oersteds		
	Bm	Br	Hc
Annealed in Dis. NH_3	17,400	6800	0.8
Annealed in Hydrogen	17,200	6800	0.5
Requirement	16,000 Min	6800 Max	0.55 Max

* Audio Trans. Steel, Grade A. U. S. gage 29.

TABLE V

MAGNETIC PROPERTIES OF NICKEL-IRON ALLOYS

	From 200 Oersteds		
	Bm	Br	Hc
Annealed in Dis. NH_3	14,200	7800	0.8
Annealed in Hydrogen	14,800	8400	0.4
Requirement	13,800 Min	9000 Max	1.0 Max

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HEAT TREATING STAINLESS STEEL

Most furnace equipment is adaptable to hardening and annealing stainless steel, although means should be provided for careful control of atmosphere, where used. Scale formation must be minimized to shorten pickling cycles. A number of suitable pickling procedures for stainless are detailed in this concluding part of a two-part article.

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FURNACE equipment for any specific heat treating cycle of stainless steel is quite varied. The choice usually depends upon such factors as production requirements per man-hr, equipment aavilable within the plant, economics, quality requirements, pickling and polishing, and so on.

In many instances, batch type furnaces fired with either oil, gas or electricity are used. These may be either of conventional design or of special design such as is used in hardening the cutlery items shown in Fig. 8. Where high production requirements demand, it may be best, from an economical viewpoint, to employ either one of the many types of continuous or semi-continuous furnaces available. At Landers, Frary & Clark, the continuous roller hearth type of furnace is used in both annealing and hardening stainless steel

In the annealing phase, a furnace such as that shown in Fig. 9 is used to good advantage; for hardening, a furnace arrangement where both the hardening and tempering units are placed in tandem facilitates continuous flow. In the latter case, an elevator quenching arrangement is provided at the exit end of the heating chamber and under a prepared atmosphere.

Characteristics of the stainless steels, selection of the right material for specific applications, and heat treatment procedures for obtaining desired properties were discussed in the first part of this two-part article in last week's issue.

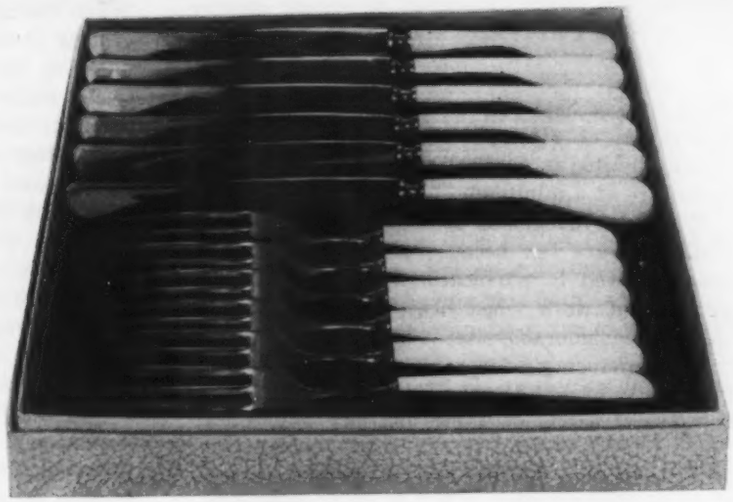

Fig. 8—The knives of this tableware set are made from the martensitic type 420 stainless steel, hardened to Rc 42 to 46. The forks are made from a ferritic stainless.

The mode of heating can be selected according to the location of each individual plant. However, electric heating may be preferable, since it not only permits accurate control of temperature, but the furnace can be started in the early morning hours and automatically rise to temperature without personal supervision.

Both the pusher type and the mesh belt continuous furnaces are also widely used; the former for bulk material that can readily be pushed through the furnace, and the latter for drawn shells and other small items. The belt type continuous furnace has a disadvantage in that the belt will stretch, and slack must be taken up periodically. Also, the life of a belt is comparatively short in comparison to rolls.

Regardless of the type of furnace or fuel employed, the carburizing conditions found in reducing atmosphere should be avoided. It is advisable not to pack parts in material that will introduce carbon to the surface. Charcoal, coke dust, bone black, cast iron turnings and similar materials will all carburize stainless steel at normal heat treating temperatures, resulting in a serious loss of corrosion resistance.

Flame impingement onto the work in either oil or gas fired furnaces may produce decarburization or, in the case of straight chromium stainless, possible carburization may occur. Decarburization is not considered too detrimental in austenitic stainless, but may result in a loss of hardening power in the surface layers of the martensitic types.

The salt bath is being used quite widely for heat treatment of the stainless steels. The life of an externally heated alloy pot is comparatively short, varying from a few weeks to several months, depending upon both the specific heat treatment and the temperature of treatment. Where a ceramic pot is used, and the salt is heated by immersed electrodes, the life is considerably longer with the added advantage that the salt will not be contaminated by metallic oxides.

Induction Heating Boosts Output

Another method worth mentioning is the use of induction heat in hardening martensitic stainless steels. This method has been tried on cutlery steels and considerable success was realized, especially in cases where selective hardening was necessary. One disadvantage in selective hardening is that the demarcation zone between hardened and unhardened areas is very distinct, especially upon a highly polished surface; this may detract from customer appeal. Another disadvantage of induction heating in general is the high cost of equipment as compared to both the salt bath and furnace methods of heating. The time cycle is very short, however, and a semi-automatic setup involving heat and quench can be formulated, realizing high production per man hr.

Bright hardening and annealing of stainless steel has become more prominent. The additional cost of atmosphere generation is often overshadowed by the savings realized in eliminating tedious and expensive operations such as pickling. Dissociated ammonia is widely accepted as a suitable atmosphere for producing bright sur-

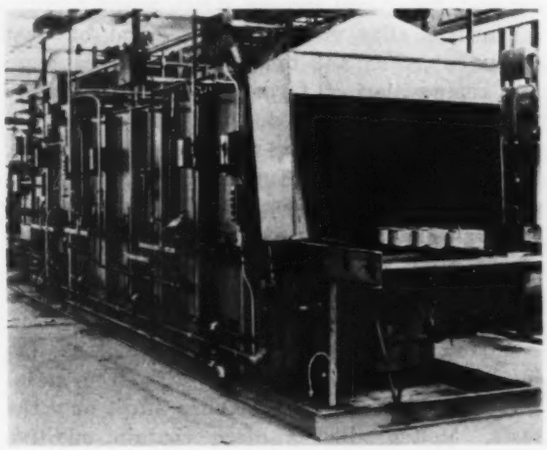

Fig. 9—Continuous roller hearth furnace used at Landers, Frary & Clark for annealing type 302 stainless.

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faces during heat treatment. Since the cost of generation of atmosphere is quite high, it is usually limited to applications where atmosphere losses are at a minimum.

Purified hydrogen is sometimes used, but installations are few because of the expense and time involved in purification. Rather than expect bright work when heat treating stainless items of considerable size, it is advisable to work toward producing a favorable scale condition, the uniformity of which will minimize pickling time. On several occasions a cracked city gas, 2.5:1,

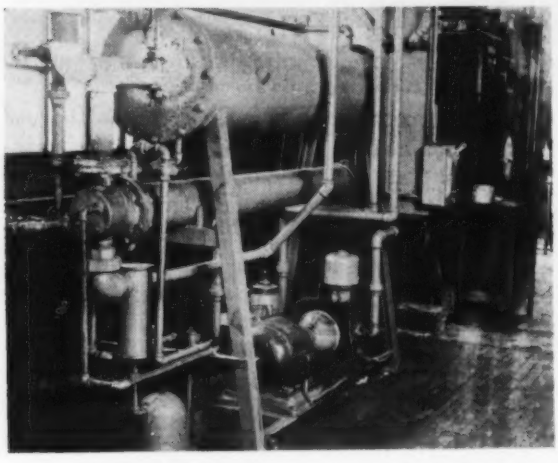

Fig. 10—Atmosphere gas generator (ratio 2.5:1) used to supply a protective atmosphere for annealing type 302 stainless steel at L. F. & C.

was used with considerable success for obtaining a uniform scale condition. A generator for this type of atmosphere is shown in Fig. 10.

Molten Alkalies Aid Scale Removal

Scale produced in standard heat treatment is difficult to remove. The variability in both complexity and tenacity of scale formation is influenced by several factors, which would normally include alloy composition, method of heat treatment, time and temperature of treatment, and composition of furnace atmosphere during the heat treating procedure. Where care is not taken to provide clean work for the furnace, the inclusion of foreign matter will increase the difficulty of removing scale. This is especially true in annealing the austenitic stainless steels where dirty work that goes through the heat treat cycle not only will result in scale removal difficulty, but also, will result in high scrap losses.

Molten alkalies and alkaline solutions are being widely used for removal of scale from stainless steel. Basically, the alkalies affect only the scale. Molten alkalies often contain additive chemicals that alter composition of the scale, making it amendable to attack by acids. At the same time, the molten alkalies, used at relatively high temperatures, tend to soften the scale. When the metal is water quenched from the operating temperatures, a shattering effect is produced on the scale as a result of the action between water and the hot alkali.

Alkali solutions of moderate concentrations, containing strong oxidizing reagents, are primarily used to change the scale composition to a form that is more susceptible to attack in acid solutions. Some softening effect is obtained, but this it not comparable to the softening effect of the molten alkalies. Alkaline solutions operate at comparatively low temperatures, and the changes in scale composition are relatively slow. However, material benefit is realized through use of an alkaline solution, when it precedes a normal acid pickling operation.

Among the various pickling procedures recommended by manufacturers of stainless steel[5] are the following:

(1) Immerse in molten sodium hydroxide containing 20 to 40 pct of weight sodium nitrate at 850° to 950°F for 15 min; water quench. Immerse in 10 to 12 pct by volume sulfuric acid, containing a good inhibitor, at 160° to 180°F for 3 to 5 min; remove and wash. Immerse in a 7 pct by weight nitric acid solution containing 1 pct hydrofluoric acid for 6 to 10 min; remove and wash thoroughly with running water, preferably under pressure. This last solution is heated to 160° to 170°F for chrome nickel steels, while room temperature will suffice for straight chromium steels.

(2) Immerse in molten sodium hydroxide containing 1.5 to 2.5 pct sodium hydride at 750° to 800°F for 10 to 15 min; water quench. Immerse in 10 to 12 pct by volume sulfuric acid containing a good inhibitor at 160° to 180°F for 1 to 2 min; remove and wash. Immerse in a 7 pct by weight nitric acid solution containing 1 pct by weight hydrofluoric acid for 5 to 10 min; remove and wash thoroughly with running water, preferably under pressure. Again, the last solution should be 160° to 170°F for chrome-nickel steel, and room temperature will suffice for the straight chromium steels. This method is patented by E. I. du Pont de Nemours & Co., Inc.

(3) Immerse in a 10 to 12 pct by volume sulfuric acid solution containing a good inhibitor at 160° to 180°F for 5 to 7 min; remove and wash. Immerse in a 12 to 14 pct by weight caustic (sodium hydroxide) solution containing 5 to 6 pct by weight potassium permangate at 170° to 180°F for 20 to 30 min; remove and wash. Return to the sulfuric acid solution for 3 to 5 min; remove and wash. Immerse in 7 pct by weight nitric acid solution containing 1 pct by weight hydrofluoric acid for 8 to 12 min; remove and wash thoroughly with running water, preferably under pressure. The last solution is heated to 160° to 170°F for chrome-nickel steels; room temperature will suffice for the straight chromium steels.

(4) Immerse in a 10 to 12 pct by volume sulfuric acid solution containing 2 to 4 pct by weight sodium chloride, with a good commercial inhibitor added, at 150° to 170°F for 10 to 15 min; remove and wash. Immerse in a 10 pct by weight nitric acid solution containing 2 pct by weight hydrofluoric acid for 8 to 15 min; remove and wash thoroughly with running water, preferably under pressure. The nitric acid solution is heated to 140° to 160°F for chrome-nickel steels, while remaining at room temperature for straight chrome steels.

(5) Immerse in a 10 to 12 pct by volume sulfuric acid solution containing approximately 5 pct by weight ferric sulfate for 10 to 15 min at 160° to 180°F; remove and wash. Immerse in a 10 pct by weight nitric acid solution containing 2 pct by weight of hydrofluoric acid for 8 to 15 min; remove and wash thoroughly with running water, preferably under pressure. This method is suitable for the chrome-nickel grades only. The nitric acid solution is heated to 140° to 160°F.

(6) Immerse in a 10 to 12 pct by volume sulfuric acid solution, containing a good inhibitor, for 15 to 20 min at 160° to 180°F; remove and wash. Immerse in a 10 pct by weight nitric acid solution containing 2 pct by weight hydrofluoric acid for 8 to 10 min; remove and wash thoroughly with running water, preferably under pressure. The second solution is heated to 140° to 160°F for chrome-nickel steels, and operated at room temperatures for the straight chromium steels.

Pickling Tanks

Sulfuric acid solutions require acid resistant brick, lead lined steel or wood tanks, glass, or wood coated with a good grade of asphalt paint. Nitric-hydrofluoric acid mixtures should be in carbon brick lined-tanks, wood, or concrete coated with a good grade of asphalt and paint. Steel tanks are best suited for alkalies and alkaline solutions.

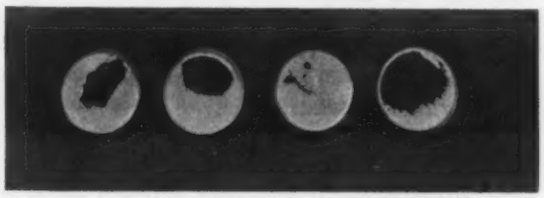

Fig. 11—If the work is soiled prior to entry into the furnace, an intergranular condition results from carbon pickup, causing excessive acid attach during pickling.

All of the solutions described work exceedingly well in removal of scale formations. To insure violation of any vested patent interest, however, prospective users should investigate the status of all methods mentioned. Experience in pickling austenitic stainless steel, especially where drawn or spun containers are formed, has shown that metal loss during pickling can be troublesome.

It was with this in mind that the ferrisul-hydrofluoric acid pickling bath was installed. Concentration of the bath used is 6 to 8 pct ferrisul and from 1.8 to 2 pct hydrofluoric acid. Temperature of the bath is held between 160° and 180°F with the time varied in accordance to the condition of the scale formation.

An advantage of using this bath is the lack of any fumes, thus eliminating fume hoods and skin irritation. It is a one bath pickle, effecting labor savings. Chemical control is important, as with all types of pickling solutions, in order to maintain top efficiency; not only is it necessary to control the hydrofluoric acid and ferrous sulfate, but the ferric sulfate build-up must be determined. Usually, a build-up of 20 or 25 pct will necessitate discarding the bath.

Fig. 12—Another example of the pickling acid corrosion resulting from dirt on the work during annealing.

Where annealed austenitic steel has been handled properly and receives a regulated time-tmperature relationship to effectively bring all carbides in solid solution, the ferrisul-hydrofluoric acid bath will remove scale without any appreciable attack on the metal. Where foreign contamination prior to heat treatment has caused a heavy carbide precipitation in the annealed austenitic stainless, the ferrisul-hydrofluoric acid bath will etch the metal considerably. In cases where the time element is sufficiently long, portions of the metal will completely dissolve, as shown in Figs. 11 and 12.

In pickling martensitic stainless steels, it is best to follow pickling with a low tempering treatment to relieve hydrogen embrittlement. This is especially true where the steel has been hardened and tempered for use in springs.

Reference

[5] "Eastern Stainless Steel Sheets," Eastern Stainless Steel Corp., Baltimore.

Radiation Pyrometer for

Tinplate temperatures between 180° and 400°F can now be measured with newly developed radiation pyrometer. Accurate measurements can be taken as close as 18 in. from heated strip. Development of prototype required investigations of radiation theory and studies of the limitations of previous instruments.

By SAM TOUR, President,
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A RADIATION pyrometer capable of accurately measuring heat emission from objects at temperatures as low as 180°F has been developed. The problem arose in the manufacture of electrolytic tinplate by one of the continuous production methods in which direct resistance is used to heat the plate to above the melting point of the electrotinned coating in order to flow the tin.

Accurate temperature control is essential for proper surface finish. The continuous method of manufacture presents the following obstacles to accurate temperature taking: (1) The heated strip travels at high speed; (2) contact thermocouples cannot be used because they would mar the tin plated surface; (3) the current in the strip creates an extensive electrical field in its vicinity.

Standard Limit Range Too High

Attempts had been made to read the strip temperature at the melting or exit end of the unit with a standard radiation pyrometer. The standard pyrometer does not measure radiation from objects below the 600° to 700°F temperature range. This is particularly true of tin surfaces for which the radiation emissivity factor is of the order of 0.05 as compared with unpolished rolled steel surfaces with emissivity factors of about 0.65.

The total energy a radiation instrument measures is less than 1/10 as great when observing a tin surface as when observing a bare rolled steel surface at the same temperature. For equal temperature accuracies a radiation measuring instrument for tin surfaces must be ten times as sensitive as one for bare rolled steel surfaces.

The problem was the construction of a radiation pyrometer for use on a moving strip of steel over the range of 200° to 600°F and at a distance of less than 3 ft, and preferably less than 18 in. from the strip. Consultation with manufacturers of solar radiation measuring equipment revealed that the design limitation of such instruments would prevent their successful operation first, in this temperature range, and second, at so close a distance to the source of heat.

Bell Telephone Laboratories brought to light a special instrument developed for the Navy that was capable of detecting the temperature of a ship stack at a distance of about a mile. It was felt that this instrument, known as a thermistor, could be used as the basic element of the instrument to be constructed.

Experiments to provide the necessary information for the design and construction of this radiation-temperature reading device were carried out in the laboratories of Sam Tour & Co., Inc., New York, with Bell Telephone engineers assisting in the investigation.

The prototype setup that evolved consisted of an amplifier, a thermistor bolometer, 30 ft of metal armored electrostatically shielded cable, a telechron motor, and Mumetal and copper shields and covers, see Fig. 1.

The basic principle of the system, originally developed by the Bell Telephone Laboratories for infra-red applications, employs an interrupted radiation technique to provide a modulated signal at the receiver element of the thermistor bolometer. The modulated signal permits the use of amplifiers having circuit designs of high stability and freedom from drift as compared with amplifier systems required for dc signals.

Lower Temperatures

Fig. 1—The radiation pyrometer unit as set up is capable of measuring temperatures between 180° to 400° F on fast moving strips of hot metal.

A typical infra-red spectrometer is used. Radiant energy from the source passes between the sector blades, which rotate at a speed to give 15 cycles per sec modulations, and then through the entrance slit to the dispersing part of the spectrometer. The dispersed radiation then passes through the exit slit to the receiver element of the thermistor bolometer, where it serves to produce 15 cycles per sec heating in proportion to the incident radiation. This heating causes a corresponding change in the element resistance that gives rise to an alternating voltage across the electrically biased element. The alternating voltage is amplified in the selectively tuned amplifier and rectified to provide a dc output voltage proportional to the incident radiation.

Uses Steel and Copper Shields

The active part of the Sett element (or thermistor bolometer) is a thin flake, about 10 microns thick, of a semiconducting material. This flake has a negative temperature coefficient of resistance about 10 times the magnitude of that for metals. The present standard forms of thermistor bolometers contain two flakes, a receiver element and a temperature compensating element, each having similar static thermal and electrical characteristics. The outline dimensions of the standard bolometer housing and the internal connections are shown in Fig. 2. The receiver element is centered behind a NaCl or KBr crystal to receive the interrupted beam of infra-red energy. The compensator is located at one side and is shielded from the beam.

The amplifier used is a six-stage, high gain, low noise level, high impedance input unit with a narrow pass band. It was designed especially for use with standard thermistor bolometers. The pass band, provided by two parallel T feedback networks, is centered at 15 cycles per sec, and is approximately 2 cycles wide. The amplifier incorporates a regulated power unit supplying all voltages required by the amplifier as well as bias voltage for the thermistor bolometer.

For shielding the thermistor bolometer, a set of five nested, hydrogen annealed metal shields were obtained. Three shields were of Allegheny Mumetal and two shields of copper. A suitable sight hole ¼ in. in diam was drilled through the nest of shields after which the Mumetal shields were reannealed in hydrogen.

To calibrate the instrument, test equipment was set up with a transformer to supply current for heating the tinned steel sheet, and a transite box to protect the sheet from air currents. A thermocouple welded or held to the back of the sheet measured its temperature. The thermistor bolometer unit was aligned by positioning the Sett element and the control spot of the heated sheet on a line through the opening in the tran-

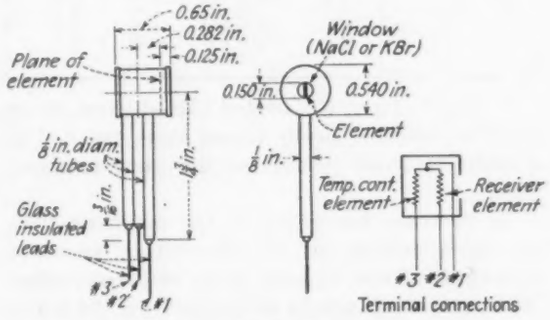

Fig. 2—The semiconducting flake may be seen behind the window in this outline dimension sketch of the thermistor bolometer unit of the radiation pyrometer.

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site wall, see Fig. 3. The amplifier for the radiation pyrometer, was used to build up the signals and a potentiometer was used to measure the amplifier output.

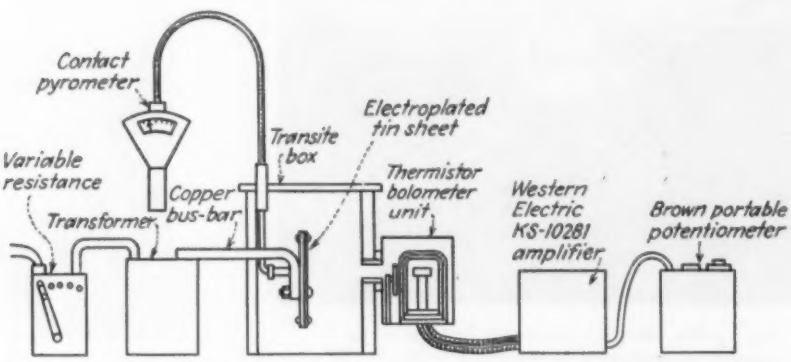

Fig. 3—The test equipment setup as shown was used for the calibration of the instrument.

The instrument was calibrated by heating the tinplate and then recording the temperature registered on the thermocouple pyrometer and the amplified millivolt output. This was done several times under various conditions and at various temperatures. In addition, the speed of response of the radiation pyrometer was measured and was found to be 6 sec.

The effect of the magnetic field on the pickup of the thermistor bolometer was greatly reduced through the use of the five nesting shielding cans. Actual values are shown in the accompanying table.

SHIELDING EFFECTS ON BOLOMETER

Distance of Thermistor Bolometer from Transformer, In.	Induced Pick-up, No Shielding, MV.	Induced Pick-up, 1 Shielding Can, MV.	Induced Pick-up, 5 Shielding Cans, MV.	Transformer Off, MV.
12	5.52	0.67 to 0.89	0.27	0.27
8	7.71	1.12 to 1.56	0.58	0.20
4	12.90	0.67 to 1.03	0.58	0.46
2	16.33	1.12 to 1.61	0.27	0.27

A change from the melted tinned sheet to an unmelted electrolytically tinned sheet resulted in a lower millivolt output for the same temperature.

To decrease the effect of the magnetic field, the cable leading into the thermistor bolometer was shielded and encased in an armored casing. When placed at various distances from the transformer there was no variation in millivolt output until the outside armor actually touched the core of the transformer.

A millivoltmeter was used to measure the amplified output of the thermistor bolometer. This was done to establish whether or not the drop in potential of the millivoltmeter had any appreciable effect on the measured millivolt output. It was found that use of a potentiometer resulted in a slightly higher accuracy but did not change the curve.

The results of the second calibration may be seen in Fig. 4 at the Sett voltage of 125. The points plotted on the graph do not fall exactly on the drawn line used for millivolt output to temperature. For example, at 0.45 mv the conversion on the line gives 192°F, although one of the points was 18°F higher. At 4.3 mv the line conversion is 360°F, although one of the points plotted was 5°F higher. This curve indicates that the radiation pyrometer is more accurate at the higher end of the calibrated range. It should also be noted that the instrument is no more accurate than the contact pyrometer used in its calibration, which was 5°F.

An aligning device was designed to keep the heated area in direct sight of the measuring equipment in the thermistor bolometer. This device consisted of a brass rod of the proper diameter to pass through the holes in the shielding cans and through the thermistor bolometer. A collar was placed on the rod to prevent insertion to the point where the window in the front of the themistor bolometer would be contacted. The calibration curves apply only when the alignment is correct, since misalignment affects the amount of infra-red radiation reaching the instrument.

Testing for the effects of distance, it was found that increasing the gap from the heated plate to the thermistor bolometer about 2 or 3 in.

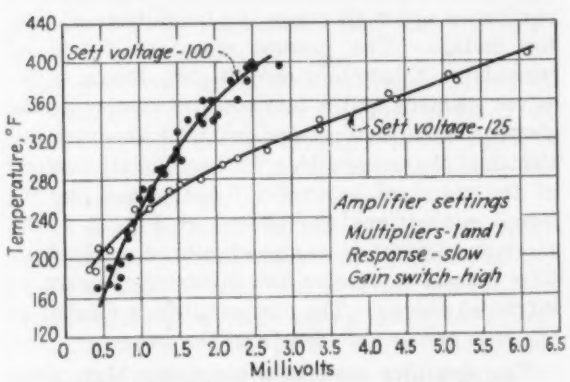

Fig. 4—The results of calibrations on the radiation pyrometer at Sett voltages of 125 and 100 indicate that the instrument is more accurate at the higher end of the calibrated range.

had little effect. Tests at further distances could not be considered accurate since there was no way of knowing whether the alignment was maintained as the instrument was moved away.

The final calibration of the radiation pyrometer was made with a Sett voltage of 100 applied to each crystal. This was done to permit the use of the equipment at higher ambient temperatures. Fig. 5 shows this calibration. The lower part of the curve is limited by the very small output around 180°F. The upper part of the curve is limited by oxidation of the tin coating on the calibration sheets at temperatures around 400°F. The accuracy of the instrument using a Sett voltage of 100 is as follows: At 0.75 mv output, or 205°F, the plotted points fall both 25°F above and below the drawn line. Around 2.1 mv output, or 360°F, they fall 15°F above and below the drawn line.

An overall analysis of the radiation pyrometer in its final form revealed that it is capable of measuring temperatures of unmelted electrolytically tinplated sheet under suitable conditions from 180° to 400°F and above. The accuracy of the radiation pyrometer as indicated in the tests is about ±25°F at 200°F, and ±15°F at 375°F, for a Sett voltage of 100. For a Sett voltage of 125 the accuracy is ±20°F at 190°F, and ±5°F at 360°F. The speed of response of the setup is 6 sec.

This radiation pyrometer should not be used when the ambient temperature exceeds 110°F. To insure maximum accuracy, the bolometer window and the openings in the shielding cans must be squarely aligned. The output of the instrument will be affected if the outside magnetic field magnetically saturates the armored cables or the shielding cans covering the thermistor bolometer. Different types of material have different emissivity constants, therefore the bolometer must be properly calibrated for use with each material.

The completed unit, as shown in Fig. 1, was used successfully in an electrolytic tinplate plant. The bolometer on the end of the aluminum tube was held in position to sight on moving heated strip at numerous desired locations. The distance of the bolometer from the moving strip was 13 in. It was possible to get temperature readings at some eight locations between the cold or ingoing end and the hot or outgoing end of the heating chamber. The temperature gradients necessary to flow the tin and the shape of the temperature-rise curve were determined through use of the instrument.

Insulated Pipe Supports Cut Heat Losses

TO prevent excessive heat losses resulting from direct metal-to-metal contact between hot pipe surfaces and structural supports, insulated supports may be used. The entire length of piping is insulated in the usual manner and then supported by hangers or by channel irons. This type of installation was developed by Sargent & Lundy, engineers, from test work done at the University of Illinois.

Where the piping is to be supported by a hanger, a 10-gage steel plate, its length proportioned to the load to be carried, is rolled into a band to fit the insulated pipe and provided with a flange for assembly. A saddle plate, ⅜ in. thick, is then tacked welded around the lower half of the flanged band, to assist in carrying the direct load and in spreading it over a wide area. The unit is then bolted into place around the insulated pipe, a filler bar is fitted over the upper half of the flanged band, and the usual hanger strap is fastened around the entire assembly.

Where the pipe line is to be supported by channel irons, a 16-gage sheet metal band, 18 in. long and flanged for assembly, is bolted around the insulated pipe at each point of support.

Since the pipe rests on the insulation at the supports, the insulating material used must be able to bear the weight of the pipe. On the basis of the tests conducted at the University of Illinois, a loading capacity of 10 psi or 100 lb per running inch of pipeline, has been established for 85 pct magnesia.

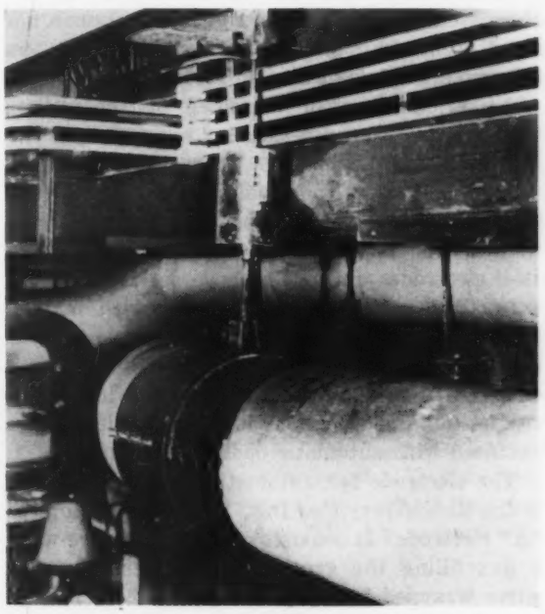

Fig. 1—This specially designed pipe hanger is installed on main steam line at Tyrone station of the Kentucky Utilities Co. Weight of the pipe rests on the magnesia insulation.

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COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Provision for Federal Income Taxes	Net Income	In Pe of
U. S. Steel Corp.	1949	32,000,000	25,807,000	82.5	18,212,000	$2,301,685,689	$126,000,000	$165,908,829	
	1948	31,300,000	29,300,000	93.8	20,700,000	2,481,508,535	109,000,000	129,627,845	
Bethlehem Steel Corp.	1949	14,200,000	12,596,949	88.7	9,217,188	1,271,040,076	66,500,000	99,283,539	
	1948	13,800,000	13,411,492	97.2	9,993,481	1,315,188,536	57,225,000	90,347,560	
Republic Steel Corp.	1949	8,700,000	6,804,020	79.1	5,123,608	651,952,835	35,000,000	46,142,323	
	1948	8,600,000	8,324,172	96.8	6,405,581	772,000,047	34,000,000	46,438,382	
Jones & Laughlin Steel Corp.	1949	4,816,500	4,170,432	87.0	3,042,296	386,046,149	13,150,000	20,961,245	
	1948	4,815,000	4,633,558	97.0	3,695,414	446,057,301	18,950,000	31,222,451	
National Steel Corp.	1949	4,200,000	.....	.....	.....	424,892,845	37,400,000	39,311,269	
	1948	4,050,000	.....	.....	.....	436,522,051	33,300,000	40,121,506	
Youngstown Sheet & Tube Co.	1949	4,082,000	3,478,259	85.2	2,550,380	338,344,004	19,894,000	31,777,010	
	1948	4,002,000	3,966,099	99.1	2,982,057	381,742,264	25,400,000	35,711,732	
Armco Steel Corp.[3]	1949	3,793,000	3,131,020	82.5	2,389,103	341,350,147	19,315,315	30,918,202	
	1948	3,563,000	3,332,261	93.5	2,572,608	382,563,811	20,072,015	32,030,712	
Inland Steel Co.	1949	3,400,000	3,019,655	88.8	2,715,398	347,640,710	15,935,000	25,013,707	
	1948	3,400,000	3,533,374	103.9	3,252,681	394,716,908	23,221,000	38,606,898	
Sharon Steel Corp.	1949	1,672,000	1,001,625	59.9	738,584	90,068,564	1,650,000	3,325,964	
	1948	1,672,000	1,298,383	77.7	964,987	118,849,560	5,811,000	9,234,983	
Wheeling Steel Corp.	1949	1,536,000	1,227,600	79.9	.....	143,419,446	5,819,000	7,896,265	
	1948	1,409,000	1,303,424	92.5	.....	154,953,406	10,000,000	15,050,045	
Colorado Fuel & Iron Corp.[14]	1949	1,472,000	1,446,693	98.3	1,348,138	138,344,200	6,059,200	10,182,919	
	1948	1,472,000	1,395,717	94.8	1,225,027	118,858,896	3,659,100	6,181,777	
Crucible Steel Co. of America	1949	1,112,984	.....	.....	.....	99,393,228	351,827	1,352,764	
	1948	1,277,133	.....	.....	.....	131,360,030	2,748,021	3,596,177	
Pittsburgh Steel Co.	1949	1,072,000	717,253	66.9	595,486	80,559,351	624,000	844,810	
	1948	1,072,557	976,218	91.0	774,108	102,858,785	4,350,000	5,484,090	
Allegheny Ludlum Steel Corp.	1949	832,360	362,813	57.8	297,635	105,863,359	1,200,000	1,967,324	
	1948	496,360	462,306	93.1	428,000	126,780,255	4,601,358	6,833,384	
Lukens Steel Co.	1949	675,000	545,253	80.8	306,450	55,825,306	1,640,330	1,930,045	
	1948	624,000	647,876	103.8	.....	61,460,919	1,675,000	2,411,604	
Portsmouth Steel Co.	1949	660,000	511,647	77.5	326,386	49,744,601	3,012,000	4,885,424	
	1948	660,000	647,816	98.2	523,096	58,904,664	2,600,000	4,511,550	
Granite City Steel Co.	1949	620,000	531,824	85.8	464,131	46,496,523	1,890,000	2,958,109[4]	
	1948	620,000	493,720	79.6	408,449	41,370,688	2,370,000	3,267,707	
Copperweld Steel Co.	1949	554,400	.....	.....	.....	42,708,329	900,000	1,737,506[6]	
	1948	554,400	.....	.....	.....	75,570,115	3,414,500	4,989,019[13]	
Alan Wood Steel Co.	1949	550,000	381,710	69.4	270,803	35,895,460	1,480,000	2,255,840	
	1948	550,000	530,691	96.5	425,114	47,480,574	2,842,000	4,116,444	
The Midvale Co.	1949	449,950	67,647	15.0	.....	13,739,443	None	*1,094,387*	
	1948	517,322	64,962	12.6	.....	10,509,015	None	*1,665,718*	
Barium Steel Corp.	1949	406,000[9]	186,485	45.9	131,414	33,885,546	809,463	711,452	
	1948	441,000	390,000	88.4	310,000	51,257,670	2,048,176	2,615,270	
Continental Steel Corp.	1949	364,000	239,736	65.9	.....	22,505,562	785,000	636,716	
	1948	364,000	317,927	87.3	.....	29,743,309	1,200,000	1,625,150	
Rotary Electric Steel Co.	1949	420,000	247,350	58.9	213,976	16,865,512	955,000	1,287,063	
	1948	340,000	247,658	94.5	227,280	18,940,250	1,500,000	2,496,859	
Laclede Steel Co.	1949	326,025	283,488	87.0	263,862	31,209,110	1,815,000	2,718,352	
	1948	326,025	278,170	85.3	284,538	34,072,411	1,165,000	1,767,863	
Northwestern Steel & Wire Co.[11]	1949	321,000	288,814	90.0	231,193	28,564,916	1,195,000	2,243,938	
	1948	321,000	287,670	89.6	235,385	26,641,518	1,180,000	1,680,477[12]	
Keystone Steel & Wire Co.	1949	302,400	308,131	101.9	276,683	36,735,489	2,600,053	5,084,181	
	1948	302,400	298,882	98.8	265,264	34,504,429	2,060,598	4,167,550	
GRAND TOTAL	1949	88,537,619	71,700,000[1]	81.0[16]	53,705,000[17]	7,134,776,400	365,980,188	510,240,409	
	1948	86,549,197	80,565,700[1]	94.0[16]	60,035,000[17]	7,861,587,539	374,392,768	522,471,317	
Percent change 1949 over 1948		+2.3	−11	−13.8	−11	−9.2	−2.2	−2.3	

1. Estimated, based on national operating rate so as to include companies listed above that do not publish production figures.
2. Payable after 1 year.
3. Including domestic and Canadian subsidiaries.
4. After $100,000 appropriation for inventory price declines.
5. Plus 4 pct stock dividend.
6. Includes $391,834 non-recurring income.
7. Includes $256,514 (25,651 shs.) common stock and scrip issuable in 1950 for stock dividends.
8. Two
9. Doe Co.,
10. 10
11. Fisc

ancial Analysis of the Steel Industry, 1949-1948

Net Income	Net Income Percent of Sales	Number of Common Shares Outstanding	Earnings Per Common Share	Common Dividends Declared	Number of Preferred Shares Outstanding	Preferred Dividends Declared	Funded Debt[2]	Preferred Stock	Common Stock	Surplus	Invested Capital	Working Capital	Cap per T of In Ca pac
,908,829	7.2	26,109,756	$5.39	$56,135,975	3,602,811	$25,219,677	$65,944,114	$360,281,100	$870,325,200	$687,006,870	$1,983,557,284	$483,843,683	$61.
,627,845	5.2	8,703,252	12.00	52,219,512	3,602,811	25,219,677	71,554,196	360,281,100	870,325,200	602,453,693	1,904,614,189	469,505,437	60.
,283,539	7.8	9,582,942	9.68	22,999,060	933,887	6,537,209	169,564,000	93,388,700	303,459,830	337,348,399	903,760,929	382,411,733	63.
,347,560	6.9	8,954,982	9.36	21,491,956	933,887	6,537,209	121,814,000	93,388,700	283,574,430	268,208,157	766,985,287	280,644,542	55.
,142,323	7.1	5,893,103	7.54	17,677,492	282,043	1,692,558	58,966,653	28,204,300	135,979,066	190,743,325	413,893,344	156,087,187	47.
,438,382	6.0	5,882,604	7.61	12,757,289	282,143	1,692,858	70,370,270	28,214,300	138,189,928	163,970,323	400,744,821	148,633,092	46.
,961,245	5.4	2,600,327	7.50	6,760,850	293,568	1,467,840	60,461,497	29,356,800	103,936,900	130,771,940	324,527,137	96,422,995	67.
,222,451	7.0	2,476,502	12.01	5,324,479	293,568	1,467,840	60,000,000	29,356,800	96,507,400	125,303,616	311,167,816	107,387,078	64.
,311,269	9.3	2,453,950	16.02	13,481,585	None	None	40,000,000	None	61,348,750	193,480,944	294,829,694	129,042,022	70.
,121,506	9.2	2,453,900	16.35	11,154,085[2]	None	None	40,000,000	None	61,347,500	167,457,222	268,804,722	98,162,348	59.
,777,010	9.5	1,675,008	18.97	10,050,048	None	None	30,000,000	None	105,088,053	95,801,638	272,689,691	166,936,851	66.
,711,732	9.4	1,675,008	21.32	8,375,040	None	None	30,000,000	None	105,088,053	99,474,676	250,962,729	149,085,855	58.
,918,202	9.1	3,909,352	7.68	9,767,996	200,000	899,787	64,290,000	20,000,000	39,093,522	138,514,143	261,897,665	107,211,797	69.
,030,712	8.4	3,909,361	8.00	7,783,051	199,930	899,708	69,160,000	19,993,000	39,093,612	127,431,754	255,678,366	112,533,281	71.
,013,707	7.2	4,899,315	5.11	14,697,945	None	None	71,250,000	None	62,500,000	105,877,459	256,763,206	115,634,562	75.
,606,898	9.8	4,899,315	7.88	14,697,945	None	None	73,250,000	None	62,500,000	95,561,697	231,311,697	121,275,990	68.
,325,964	3.7	617,242	5.39	1,234,482	None	None	9,200,000	None	6,232,810	34,484,252	49,917,062	24,392,742	29.
,234,983	7.8	617,242	14.96	1,543,103	None	None	9,900,000	None	6,232,810	32,392,770	48,525,580	24,774,495	29.
,896,265	5.5	569,559	10.68	2,278,236	363,166	1,815,830	40,950,000	36,316,600	28,477,950	52,451,413	158,195,963	52,176,175	102.
,050,045	9.7	569,559	23.24	1,566,287	363,166	1,815,830	42,103,000	36,316,600	28,477,950	48,649,214	155,546,764	56,388,428	110.
,182,919	7.4	1,145,355	8.46	2,281,524	477,128	490,954	11,687,500	9,554,333	5,726,775	50,439,830	77,408,438	24,998,094	52.
,181,777	5.2	1,127,185	5.04	1,408,554	501,403	502,785	8,800,000	10,028,067	5,635,925	42,478,406	66,942,398	19,094,581	45.
,352,764	1.4	488,680	None	None	310,575	1,168,641	23,255,000	31,057,500	12,217,014	25,570,535	92,304,721	30,591,490	82.
,596,177	2.7	488,683	4.15	None	313,576	1,567,855	25,007,500	31,357,600	12,217,077	24,836,603	93,418,780	32,541,895	73.
844,810	1.1	508,917	.04	None	164,382	945,582	6,466,560	16,438,200	4,862,190	26,419,227	54,186,177	21,680,466	50.
,484,090	5.3	508,917	9.07	None	164,382	823,760	7,020,640	16,438,200	4,862,190	26,519,999	54,841,029	23,550,867	51.
,967,324	1.9	1,288,831	1.15	2,577,662	107,383	483,242	None	10,738,300	8,055,194	33,865,906	52,659,400	21,946,677	63.
,833,384	5.4	1,288,831	5.05	2,577,662	107,383	319,754	None	10,738,300	8,055,194	35,276,183	54,069,677	29,904,565	108.
,930,045	3.5	317,976	6.07	333,875	None	None	3,509,000	None	3,179,760	16,419,117	23,107,877	12,095,068	34.
,411,604	3.9	317,976	7.35	476,964	None	None	None	None	3,179,760	14,686,885	17,866,645	8,939,351	28.
,885,424	9.8	1,262,275	3.87	1,893,412	None	None	None	None	1,262,275	20,422,673	21,750,173	12,678,900	32.
,511,550	7.7	1,273,200	3.54	1,280,188	None	None	None	None	1,352,500	17,948,475	19,300,975	9,361,587	29.
,958,109[4]	6.4	397,787	7.44	764,976[5]	None	None	1,243,292	None	8,823,031	10,083,709	21,050,032	6,774,084	32.
,267,707	7.9	382,488	8.54	860,603	None	None	2,882,525	None	8,483,821	8,229,787	20,396,133	6,904,782	31.
,737,506[6]	4.1	514,864	3.24[6]	1,132,701	24,320	67,058	None	1,216,000	2,574,320	11,830,017	15,620,337	9,014,436	28.
,989,019[13]	6.6[13]	514,864	9.54	1,390,133	28,880	76,952	None	1,444,000	2,574,320	9,795,974	13,814,294	8,569,442	24.
,255,840	6.3	507,889	3.76	See Note 7	68,863	346,190	6,300,000	6,886,300	5,335,404[8]	9,026,310	27,548,014	5,377,744	50.
,116,444	8.7	483,767	7.78	483,662	70,363	353,084	6,300,000	7,036,300[13]	4,837,670[13]	7,564,896[13]	25,738,866	6,444,468	46.
,094,387	*8.0*	600,000	*1.82*	None	None	None	None	None	10,574,621	5,209,518	15,784,139	9,875,615	35.
,665,718	*15.9*	600,000	*2.78*	1,048,949	None	None	None	None	10,574,621	7,159,833	17,734,454	12,434,962	34.
711,452	2.1	2,183,769	.33	See Note 10	None	None	None	None	2,183,769	11,112,194	13,295,963	4,589,943	32.
,615,270	5.3	1,978,831	1.32	None	None	None	None	None	1,978,831	10,573,589	12,552,420	5,031,410	28.
636,716	2.8	501,364	1.27	752,046	None	None	None	None	7,018,845	7,959,404	14,978,249	7,215,211	41.
,625,150	5.5	501,365	3.24	877,390	None	None	None	None	7,018,866	8,074,734	15,093,600	7,373,605	41.
,287,063	7.6	193,676	6.7	290,421	None	None	3,000,000	None	1,936,760	5,156,530	10,093,290	2,997,407	26.
,496,859	13.2	192,939	12.94	2,496,630	None	None	None	None	1,929,390	4,151,847	6,081,237	2,344,006	17.
,718,352	8.7	206,250	13.18	1,031,250	None	None	2,177,983	None	4,125,000	6,430,933	12,733,916	6,009,712	39.
,767,863	5.2	206,250	8.57	721,875	None	None	2,309,673	None	4,125,000	4,743,831	11,178,504	5,005,390	32.
,243,938	7.9	817,825	2.74	1,022,282	None	None	None	None	4,089,125	2,672,051	6,761,176	2,783,831	21.
,680,477[12]	7.0	817,825	2.27	817,825	None	None	None	None	4,089,125	1,450,393	5,539,518	2,146,694	17.
,084,181	13.8	1,875,000	2.71	1,875,000	None	None	None	None	2,604,167	13,978,231	16,582,398	5,712,980	54.
,167,550	12.1	1,875,000	2.22[10]	1,875,000	None	None	2,000,000	None	2,604,167	10,769,050	15,373,217	5,237,809	50.
,240,409	7.2	71,121,012	.....	169,038,818	6,828,126	41,134,568	632,265,599	643,438,133	1,801,010,331	2,223,076,568	5,395,896,275	1,898,501,305	60.
,471,317	6.7	52,699,846	.....	153,228,182	6,861,492	41,277,312	642,471,804	644,592,967	1,774,855,340	1,965,163,607	5,044,411,545	1,753,275,960	58.
−2.3	+7.5	+3.5	.....	+10.3	−0.5	−0.3	−1.6	−0.2	+1.5	+13.1	+7.0	+8.3	+4.

8. Two 5 pct stock dividends declared.
9. Does not include 450,000 net tons of Phoenix Iron and Steel Co., acquired during 1949 but inoperative until Feb., 1950.
10. 10 pct stock dividend.
11. Fiscal years ended July 31.
12. Adjusted to reflect final figures after audit.
13. Revised.
14. Fiscal years ended June 30.
15. Approximate.
16. National rate for entire industry by American Iron & Steel Institute.
17. Estimated.

Italics indicate loss.

, 1949-1948

DATA COVER OPERATIONS OF 26 COMPANIES REPRESENTING 92 PCT OF THE INGOT CAPACITY OF THE UNITED STATES AS OF JAN. 1, 1949

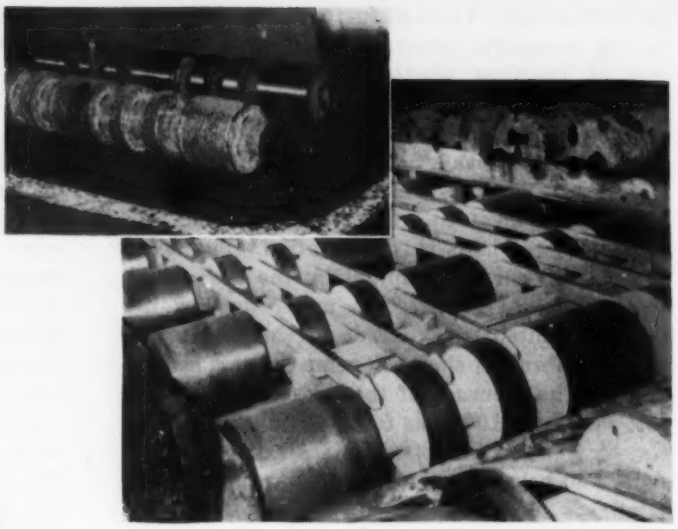
ion k	Surplus	Invested Capital	Working Capital	Capital per Ton of Ingot Capacity	Net Income Percent of Investment	Year	COMPANY
5,200	$687,006,870	$1,983,557,284	$483,843,683	$61.99	8.5[15]	1949	U. S. Steel Corp.
5,200	602,453,693	1,904,614,189	469,505,437	60.85	6.9[15]	1948	
0,830	337,348,399	903,760,929	382,411,733	63.65	11.5	1949	Bethlehem Steel Corp.
4,430	268,208,157	766,985,287	280,644,542	55.58	12.2	1948	
0,066	190,743,325	413,893,344	156,087,187	47.57	11.6	1949	Republic Steel Corp.
0,928	163,970,323	400,744,821	148,633,092	46.60	12.2	1948	
6,900	130,771,940	324,527,137	96,422,995	67.38	7.0	1949	Jones & Laughlin Steel Corp.
7,400	125,303,616	311,167,816	107,387,078	64.62	10.6	1948	
4,750	193,480,944	294,829,694	129,042,022	70.20	13.8	1949	National Steel Corp.
7,500	167,457,222	268,804,722	98,162,348	59.73	15.4	1948	
6,053	95,801,638	272,689,691	166,936,851	66.80	12.5	1949	Youngstown Sheet & Tube Co.
6,053	99,474,676	250,962,729	149,085,855	58.61	15.4	1948	
4,522	138,514,143	261,897,665	107,211,797	69.05	12.7	1949	Armco Steel Corp.
4,612	127,431,754	255,678,366	112,533,281	71.76	14.6	1948	
0,000	105,877,459	256,763,206	115,634,562	75.52	9.7	1949	Inland Steel Co.
0,000	95,561,697	231,311,697	121,275,990	68.03	15.5	1948	
2,810	34,484,252	49,917,062	24,392,742	29.85	6.7	1949	Sharon Steel Corp.
2,810	32,392,770	48,525,580	24,774,495	29.02	19.0	1948	
7,950	52,451,413	158,195,963	52,176,175	102.99	5.0	1949	Wheeling Steel Corp.
7,950	48,649,214	155,546,764	56,388,428	110.40	9.7	1948	
6,775	50,439,830	77,408,438	24,998,094	52.59	13.2	1949	Colorado Fuel & Iron Corp.
5,925	42,478,406	66,942,398	19,094,581	45.48	9.2	1948	
7,014	25,570,535	92,304,721	30,591,490	82.93	1.5	1949	Crucible Steel Co. of America
7,077	24,836,603	93,418,780	32,541,895	73.15	3.8	1948	
2,190	26,419,227	54,186,177	21,680,466	50.55	1.5	1949	Pittsburgh Steel Co.
2,190	26,519,999	54,841,029	23,550,867	51.13	9.6	1948	
5,194	33,865,906	52,659,400	21,946,677	63.27	3.7	1949	Allegheny Ludlum Steel Corp.
5,194	35,276,183	54,069,677	29,904,565	108.93	12.6	1948	
0,760	16,419,117	23,107,877	12,095,068	34.23	8.4	1949	Lukens Steel Co.
0,760	14,686,885	17,866,645	8,939,351	28.63	12.8	1948	
2,275	20,422,673	21,750,173	12,678,900	32.95	22.5	1949	Portsmouth Steel Co.
2,500	17,948,475	19,300,975	9,361,587	29.24	23.4	1948	
3,031	10,083,709	21,050,032	6,774,084	32.50	14.1	1949	Granite City Steel Co.
3,821	8,229,787	20,396,133	6,904,782	31.61	16.0	1948	
4,320	11,830,017	15,620,337	9,014,436	28.18	11.1	1949	Copperweld Steel Co.
4,320	9,795,974	13,814,294	8,569,442	24.92	36.1	1948	
5,404[8]	9,026,310	27,548,014	5,377,744	50.09	8.2	1949	Alan Wood Steel Co.
7,670[13]	7,564,896[13]	25,738,866	6,444,468	46.80	16.0	1948	
4,621	5,209,518	15,784,139	9,875,615	35.08	.....	1949	The Midvale Co.
4,621	7,159,833	17,734,454	12,434,962	34.28	.....	1948	
3,769	11,112,194	13,295,963	4,589,943	32.75	5.4	1949	Barium Steel Corp.
3,831	10,573,589	12,552,420	5,031,410	28.46	21.5	1948	
3,845	7,959,404	14,978,249	7,215,211	41.15	4.3	1949	Continental Steel Corp.
3,866	8,074,734	15,093,600	7,373,605	41.47	10.8	1948	
6,760	5,156,530	10,093,290	2,997,407	24.03	12.8	1949	Rotary Electric Steel Co.
9,390	4,151,847	6,081,237	2,344,006	17.89	41.5	1948	
5,000	6,430,933	12,733,916	6,009,712	39.06	21.4	1949	Laclede Steel Co.
5,000	4,743,831	11,178,504	5,005,390	32.99	15.8	1948	
9,125	2,672,051	6,761,176	2,783,831	21.06	33.1	1949	Northwestern Steel & Wire Co.
9,125	1,450,393	5,539,518	2,146,694	17.26	30.3	1948	
4,167	13,978,231	16,582,398	5,712,980	54.84	30.7	1949	Keystone Steel & Wire Co.
4,167	10,769,050	15,373,217	5,237,809	50.84	27.1	1948	
0,331	2,223,076,568	5,395,896,275	1,898,501,305	60.94	9.5[15]	1949	GRAND TOTAL
5,340	1,965,163,607	5,044,411,545	1,753,275,960	58.08	10.4[15]	1948	
5	+13.1	+7.0	+8.3	+4.9	−9.1[15]		Percent change 1949 over 1948

6. National rate for entire industry by American Iron & Steel Institute.
7. Estimated.

Italics indicate loss.

Mill Rolls Salvaged

BY STAINLESS FACING



Stainless surfaced rollers installed in a rolling mill table. The inset shows a roller as it leaves the welding machine (foreground) and a finish ground roller (background).

SURFACING forged or cast steel conveyer rollers with stainless steel has helped solve an acute maintenance problem of a large midwestern steel company. The rollers, shown in the illustration, are 7 ft long x 9¾ in. diam, weigh 1000 lb, and are made of 0.25 to 0.40 pct carbon steel. They convey sheets up to 5/16 in. thick at approximately 1600°F through a continuous hot sheet mill, and operate continuously at 250 rpm in a cooling spray of filtered river water.

A serious loss in diameter of the rollers through corrosion necessitated resizing by welding every 6 to 12 months. Corrosion and pitting were accentuated by abrasion of the hot sheets, since the mill delivery speed is somewhat slower than the rollers. Resizing with mild steel or hard steel electrodes did not improve service life.

In 1947 a roller was surfaced with manual stainless steel electrodes. This roller has been in operation more than 2 years with no appreciable pitting or loss in diameter. In view of the results obtained, about 50 more rollers were surfaced with automatic open arc welding.

The electrode for automatic open arc welding is the Reid Avery Co., Inc., Raco Composite type "A" electrode. It consists of a grooved core wire, a flux filling the grooves, and a series of fine wires wrapped helically around the core to provide electric contact. The electrode is supplied in coils and has a cross section equivalent to a 3/16-in. manual electrode. The deposited weld metal has the same composition as AISI type 308 stainless steel.

Worn rollers to be resurfaced, which are about 1-in. diam undersize, are positioned for welding in a lathe. They are rebuilt to within ⅛ to ¼ in. of desired diameter with a low-alloy steel electrode of the same open arc construction as the stainless electrode. The remainder of the diameter is built up with stainless steel.

A standard automatic welding head is used to feed the coiled electrode, and a special contacting device attached to the head supplies 200 amp, reverse polarity current. The roller during welding makes 36 revolutions per hr, while the welding head is moving horizontally 7.1 in. per hr. The lathe has a limit switch so that once the arc is started no further attention is required until the arc is switched off at the end of the roller. The slag is removed by gentle tapping, and a second layer of weld metal is deposited. The roller is brought to finished size by grinding.

The life of the stainless-surfaced rollers is expected to be at least 10 times the life of the original carbon steel roller. The saving in maintenance replacement time more than offsets the cost of the stainless steel surface. The automatic open arc welding machine with continuous flux covered electrodes requires the attention of only one operator part time. While the machine is running, the operator assumes his other duties at a manual welding bench.

Besides these sheet mill conveyer rollers this company is also surfacing other rollers with stainless, such as the tapered rollers for the 90° turning table.

The successful results appear to be the result of the high corrosion resistance of the stainless steel surface. The savings are so encouraging that the same principle is being applied to remove other troublesome maintenance items from the replacement list in the steel mill.

Superior Machining At Lower Cost With MX

By GEORGE R. CASKEY
Metallurgical Engineer, Bliss & Laughlin, Inc., Chicago

FOR years the trade has searched for improved machining steels. The better mousetrap has appeared at last, only they did it with silicon and carbon instead of more of the old sulfur routine. MX, a Carnegie-Illinois Corp. steel, has been on the market one year. That the steel machines better has been told, THE IRON AGE, Feb. 2, 1950, p. 86. Additional data are now available which permit a better evaluation of this type of free machining steel.

The test data presented and the experience of users indicate that MX steel differs only slightly from regular B-1113 Bessemer steel in its mechanical properties, response to thermal treatment, etc. In this respect MX would have no particular advantage over it for the majority of industrial applications. Its outstanding characteristic, on which application to industrial uses must primarily be based, is its improved response to machining operations. Various methods are employed to measure the relative machinability of different materials and various criteria used in judging their merits as materials for use in the manufacture of a particular part. The successful substitution of one grade of steel for another invariably must be based on hard economic considerations. The new steel must offer a definite economic advantage to justify its use.

The results obtained in machining are influenced not only by the characteristics of the steel being cut, but also by the specific cutting operations involved. It is obvious that a laboratory test which attempts to standardize all variables except material, or production tests fabricating a specific part on a specific machine will not predict exactly what performance can be obtained under different conditions. However, a fair correlation between the relative machinability of different steel grades, as determined under selected laboratory tests, and that obtained on average production jobs can be made.

In the development of MX, extensive use was made of a specially developed Constant-Pressure lathe test[1] for comparing the machinability of different test heats of steel in order to evaluate the effect of the variations in composition and in steelmaking practice employed. In extensive tests made by this method, using samples from numerous production heats of both B-1113 and MX Bessemer steel,[2] the MX steel has shown an average index rating 45 pct higher than the average for regular B-1113 steel. Some individual heats have rated over 60 pct higher than the average for B-1113 steel. The minimum index obtained on MX steel has been 25 pct higher than the average index for B-1113 steel.

The results of numerous trials and production tests of MX steel, in the fabrication of a variety of parts in many different screw machine departments, have shown very close correlation with the results obtained in the laboratory tests.

To illustrate the improved results which have been obtained through the substitution of MX-B-1113 steel for regular B-1113 Bessemer steel, summaries of several production tests are shown in Tables I, II and III. These tests were

MX has proved its worth on a cost basis, saving from 16 to 22 pct on production runs. Comparative properties of MX v. B-1113 show the new steel has better elongation and reduction of area but lower strength. It steps up output and tool life, decreases downtime, improves finish and works to closer tolerances.

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conducted by screw machine job shops and other manufacturers. Every precaution possible was taken to avoid the interjection of any variable other than material so that the test results would present a fair evaluation of the merits of the steel.

In each case MX steel was tested against regular B-1113 Bessemer screw stock, which latter grade the manufacturer had regularly been using in production. The improvement in machinability provided by MX steel was judged on the basis of the increase in production rate which could be obtained without decrease in tool life, in hours, or sacrifice in part finish and dimensional tolerance. The rate of production was advanced either by increasing the cutting speed or by increasing both the cutting speed and feeds.

In the examples cited, production rates using MX steel were increased from 18 to 55.6 pct. While there was no increase in tool life as measured in hours, the tool life based on the number of parts produced before changing tools was advanced by the same percentage as was the production rate and has been so recorded in the machine test reports. Although not evaluated, the improvement in tool life was sufficient to be a significant factor in reduction of general tool expense. It was the general observation that in all cases a smoother, brighter finish was obtained. The free cutting character of MX steel was further evidenced by well broken chips and relatively cool parts.

Supplementing the machine test results given in the tables, an estimate of comparative costs has been shown. As noted, these cost figures are not those of the manufacturer, but have been calculated on the basis of assumed rates for direct labor, machine overhead and machine efficiency. Material costs are figured on current published prices. Although these cost figures are only estimated, they do illustrate the significant savings in the manufactured cost of typical screw machine parts.

Certain distinguishing characteristics of MX are found in its chemical composition and in the formation of nonmetallic inclusions present. Currently the steel is being produced regularly in one grade, the chemical composition of which falls within the limits of standard B-1113 Resulfurized Acid Bessemer steel—Carbon 0.13 max, manganese 0.70/1.00, phosphorus 0.07/0.12, sulfur 0.24/0.33. The sulfur content is usually found to run to the high side of the specified range, thus providing maximum benefit from this element. Balancing the sulfur content to minimize hot shortness in the steel the manganese generally runs near the mean of the range. These controls are the same as those which would be applied on regular B-1113 to favor good response to machining operations.

However, the distinguishing characteristics of MX steel with respect to chemical composition are found in its carbon and silicon contents. Both are held below the normal ranges found in regular B-1113 steel. The carbon content is held to 0.08 max, most heats running from 0.05 to 0.08 pct. Silicon checks have generally been found to run under 0.010 pct whereas those made on regular B-1113 frequently exceed this figure often running as high as 0.035 pct. This lower silicon content is accompanied by a difference in the appearance of the complex sulfide inclusions. While inclusions of both the globular form (Fig. 1) and the elongated plastic type (Fig. 2) are frequently found in bessemer blows, the former tend to be much more prevalent in the MX blows.

TABLE I

MACHINE TEST REPORT

Stock size —7/16 in. Rd.
Part name —Spindle sleeve
Machine —Davenport Model B
Cutting media —Sulfurized oil
Machine operations—Face, center, drill, chamfer, step ream, cut oil groove, recess, cutoff

COMPARATIVE PRODUCTION

Grade	Rpm	Sfm	Part Time, sec	Gross Parts per hr	Increase Production, pct	Tool Life Increase, pct
B-1113	1930	221	14.3	280		
MX	2500	286	10.5	343	31.9	31.9

ESTIMATE OF COMPARATIVE COSTS*

	B-1113	MX
Net production per hr at 70 pct efficiency	182	240
Hours to make 10,000 parts	54.4	41.7
Direct labor (one operator to two machines) @ $1 mach per hr	$54.40	$41.70
Machine overhead @ $4 per mach per hr	$217.60	$166.80
Conversion cost	$272.00	$208.50
Material cost	$104.54	$106.90
Total manufactured cost of 10,000 parts	$376.54	$315.40
Saving		$61.14=16.3 pct

*Note—These cost figures are not those of the manufacturer but have been calculated on the basis of assumed rates for direct labor and machine overhead and machine efficiency.

TABLE II MACHINE TEST REPORT

Stock size —¼ in. Rd.
Part name —Shaft
Machine —Brown & Sharpe #00
Cutting media —General purpose
Machine operations—Form (5 diameters) Cutoff

COMPARATIVE PRODUCTION

Grade	Rpm	Sfm	Part Time, sec	Gross Parts per hr	Increase Production, pct	Tool Life Increase, pct
B-1113	3890	255	7.0	514		
MX	4240	277	4.5	800	55.6	55.6

ESTIMATE OF PRODUCTION COSTS*

	B-1113	MX
Net production per hr at 80 pct efficiency	411	640
Hours to make 10,000 parts	24.22	15.62
Direct labor (one operator to 3 machines) @ 85¢ mach per hr	$15.75	$10.16
Machine overhead @ $1.95	$47.25	$30.48
Conversion cost	$63.00	$40.64
Material cost	$34.41	$35.11
Total manufactured cost of 10,000 parts	$97.41	$75.75
Saving		$21.66=22.2 pct

* Note—These cost figures are not those of the manufacturer but have been calculated on the basis of assumed rates for direct labor and machine overhead and machine efficiency.

When subjected to laboratory machinability tests, a blow in which the globular type inclusions predominate rate 30 pct better in machinability than one heavy with the plastic type inclusions. Similar differences in the form of inclusions have been noted in different heats of resulfurized openhearth steel, these generally being associated with a difference in the level of their silicon contents.

Mechanical properties of MX steel are similar to the standard B-1113 Bessemer screw stock. Under static tests, MX develops good strength and hardness combined with reasonably good ductility. Under impact load application MX behaves like the typical bessemer steels. Either in the hot rolled or the cold drawn condition it averages slightly lower hardness and strength than B-1113 steel. In Table IV will be found the results of tensile tests made on samples selected at random from production runs of different heats and sizes of MX steel with comparative properties obtained on similarly selected samples of B-1113 steel.

Test results reported in Table V show that for the particular heats tested, the MX heat having an 0.06 pct carbon content and the B-1113 heat 0.12 pct, the tensile and yield strengths of MX steel as-rolled and as developed by increasing amounts of cold reduction are roughly 10 pct lower than those of B-1113 steel. The percent reduction of area and percent of elongation for the MX heat are somewhat better than those of the B-1113 heat. In general conclusions that the strength of MX steel will average lower than that

TABLE III MACHINE TEST REPORT

Stock size —1 1/32 in. Rd.
Part name —Screw
Machine —Brown & Sharpe #0G
Cutting media —Sulfurized oil
Machine operations—Drill, rough and finish form, thread, cutoff

COMPARATIVE PRODUCTION

Grade	Rpm	Sfm	Part Time, sec	Gross Parts per hr	Increase Production, pct	Tool Life Increase, pct
B-1113	2260	202	19.33	186		
MX	2900	260	15	240	28	28

ESTIMATE OF PRODUCTION COSTS*

	B-1113	MX
Net production per hr at 75 pct efficiency	140	180
Hours to make 10,000 parts	71.4	55.5
Direct labor (one operator to 2 machines) @ 85¢ mach per hr	$60.69	$47.17
Machine overhead @ $2.50 per mach per hr	$178.50	$138.75
Conversion cost	$239.19	$185.92
Material cost (247 lb)	$17.66	$18.03
Total manufactured cost of 10,000	$256.85	$203.95
Saving		$52.90=20.6 pct

* Note—These cost figures are not those of the manufacturer but have been calculated on the basis of assumed rates for direct labor and machine overhead and machine efficiency.

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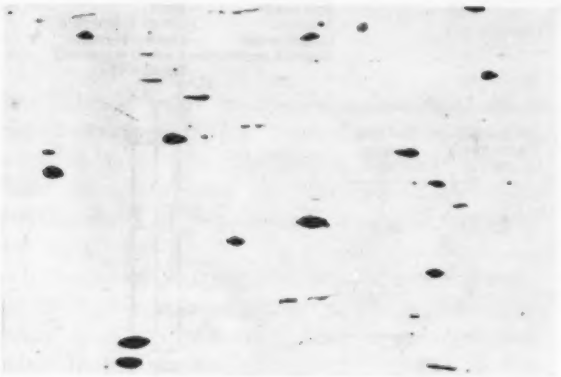

Fig. 1—Left, globular type inclusions are predominant in MX steels. (100X). Fig. 2—Above, the type of elongated plastic stringer type inclusions often found in regular bessemer steels. (100X).

TABLE IV

MECHANICAL PROPERTIES OF COLD DRAWN MX STEEL v. B-1113

Random Production Checks

Size	Draft, in.	MX Steel				B-1113 Steel			
		Tensile Strength, psi	Yield Strength, psi	Elong. in 2 in., pct	Red. of Area, pct	Tensile Strength, psi	Yield Strength, psi	Elong. in 2 in., pct	Red. of Area, pct
3/4 in. Rd.	1/16	94,200	85,200	14	47	98,500	87,400	13.5	45.8
		96,500	80,600	14	46				
27/32 in. Rd.	1/32	75,800	68,000	19	53	80,800	65,000	16	46
15/16 in. Rd.	1/16	89,600	82,200	14	40	90,600	72,200	15	48
		86,500	82,500	15	48	96,300	89,000	11	35
1 1/8 in. Rd.	1/16	85,500	77,600	16	41	88,000	81,300	17	47
		86,400	77,200	14	38				
1 3/16 in. Rd.	1/16	84,000	79,100	15	40	84,000	79,700	16	52
1 1/4 in. Rd.	1/16	86,500	76,500	18	51	87,300	75,400	15	44.9
1 1/2 in. Rd.	1/16	87,000	71,800	16	39	95,000	89,000	15	40
1 11/16 in. Rd.	1/16	77,500	70,600	14	50	79,300	69,200	16	40
3/4 in. Rd.	1/16	94,600	85,300	13	37	95,000	89,000	15	49
		92,200	85,400	14	39	99,200	78,800	12	36
7/8 in. Hex.	1/16	90,300	82,800	12	36	94,000	86,000	14	46.6
		89,700	81,500	15	39				

TABLE V

MECHANICAL PROPERTIES OF MX v. B-1113 STEEL

(Single Heat Results)

	Tensile Strength, psi	Yield Strength,* psi	Elong. in 2 in., pct	Red. of Area, pct	Hardness			
					Rockwell B		Brinell	
					Center	Surface	Center	Surface
1 in. Rd. hot rolled								
MX	62,700	41,000	31.0	60.3	69/69.5	65/67	121	114
	63,000	41,000	30.0	60.6	68/69	65/66	118	116
B-1113	71,000	48,750	27.0	50.8	74/76	75/76	131	134
	71,200	47,500	29.0	51.4	76/77	75/76	128	131
31/32 in. Rd. cold drawn								
MX	81,000	74,000	17.0	51.9	88.5/89	98/99	170	207
	79,000	72,000	16.0	51.1	89/90	94/94.5	170	198
B-1113	88,000	79,750	16.0	46.3	89/91	95/96	183	196
	88,600	80,000	15.5	44.9	88/90	95/95	179	192
15/16 in. Rd. cold drawn								
MX	88,000	82,500	15.0	46.3	90.5/91.5	97.5/98.5	183	202
	86,500	82,500	15.0	48.6	91.5/92	96.5/97.5	183	196
B-1113	96,200	88,500	10.5	33.1	94/95	99/99	202	217
	96,300	89,500	11.0	35.0	93/95	99/99	196	212
29/32 in. Rd. cold drawn								
MX	92,400	89,000	13.5	45.8	92/93	97/97.5	196	202
	92,800	89,500	14.0	46.3	94/94	98/99	202	212
B-1113	101,000	98,000	9.5	40.7	97/99	100/100.5	217	228
	101,300	99,900	10.0	39.8	97/98	100/101	223	228

* Yield strength at 0.2 pct offset.

MX	C	Mn	P	S	B-1113	C	Mn	P	S
Heat 634—Ladle Analysis	0.07	0.79	0.084	0.294	Check Analysis	0.12	0.98	0.078	0.301
Check Analysis	0.06	0.79	0.082	0.277					

of B-1113 for similar sections and cold reductions although the exact chemical compositions, hot rolling practice and other variables may result in substantial deviation from the average for individual heats.

References

[1] F. W. Boulger, H. L. Shaw and H. E. Jackson, "Constant-Pressure Lathe Test for Measuring the Machinability of Free-Cutting Steels," Trans. ASME, July 1949.

[2] A. W. MacLaren and L. W. Oswald, "Better Machinability with MX Steel," The Iron Age, Feb. 2, 1950, p. 86.

CAUSTIC ETCHING
DETECTS FATIGUE DAMAGE

By PAUL W. BOONE
Metallurgist,
Glenn L. Martin Co.,
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Caustic etching has only recently come into its own in the detection of fatigue damage in aluminum alloys. The success of this technique depends upon the use of the proper caustic conentrations, immersion times, operational precautions and optical magnifications.

A PROCEDURE based on the use of a caustic etch plus microscopic examination at 10X to 20X magnification has proved to be very effective in detecting early fatigue damage in aluminum alloys. The detecting of fatigue damage in these metals, particularly in early stages, is a difficult task at best. Fatigue cracks in their early stages are extremely small in size and very tight. Their small size makes ordinary inspection methods very ineffective.

Caustic etching is widely used in both plant inspection and laboratory as a means of detecting surface flaws. It is common practice to caustic dip forgings to accomplish cleaning and preparation for inspection. Macroetch tests on rolled and extruded products also make use of the caustic etch.

Until recently, the value of caustic etching in the detection of fatigue damage was largely overlooked. When properly used, this method is very effective. An example of the value caustic etching in detecting fine cracks is shown by Figs. 1 and 2. Both photographs show a bolt hole in an aluminum alloy test specimen that has been subjected to a number of cycles of repeated load in tension. Examination at magnifications up to 30X before etching failed to reveal any sign of fatigue damage, see Fig. 1. After caustic etching, dozens of fine fatigue cracks, as shown in Fig. 2, are visible at 10X.

Caustic etching to reveal fatigue damage is simply and easily performed. Concentration and temperature need be controlled only to the extent that a uniform etch, without local pitting, is obtained.

Small parts lend themselves to immersion etching. The entire part, or that portion under suspicion, is dipped in a solution of 50 to 200 g

FIG. 1—At a magnification of 10X the bolt hole in the fatigue specimen before etching shows no fatigue cracks.

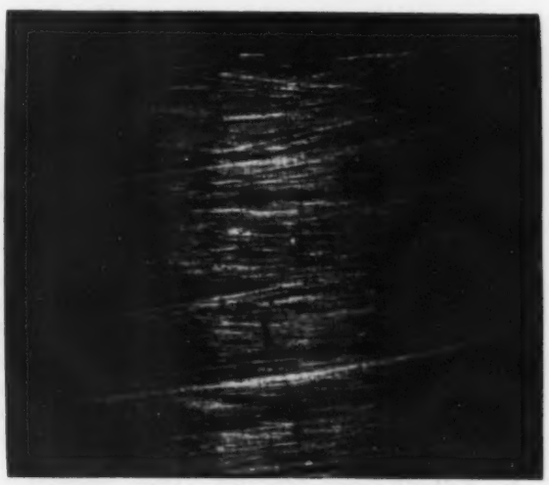

FIG. 2—After etching and at the same magnification, the bolt hole shown in Fig. 1 reveals numerous fatigue cracks.

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of sodium hydroxide per liter of water. Hot, concentrated solutions often cause pitting of aluminum alloys and should be avoided. An etching time of 3 to 15 min is usually sufficient to develop fatigue cracks to the point where they are readily visible under the microscope.

After caustic etching, parts are rinsed in water and then immersed briefly in a solution containing equal parts of water and commercial nitric acid. This solution is used at room temperature. Copper and other alloying elements used in aluminum alloys cause the formation of a loosely-adhering film after caustic etching. The dilute acid serves to remove the film of caustic-insoluble matterials. Finally, the part is rinsed in water and dried. Fatigue cracks of very small size can be detected at 10X to 20X magnification after etching in this manner.

Large parts, or those that cannot readily be removed from the structure under investigation, can be swab etched in almost any location. In this case a 40 pct caustic soda solution, 400 g sodium hydroxide per liter of water, is used in order to obtain rapid etching. The part should be free from paint, grease and other foreign matter. Anodic films need not be removed, as the caustic solution will attack and remove them. The alkaline solution is applied by means of a cotton swab, or a Q tip if the area is small.

Precautions should be taken (1) to prevent contact of the caustic with the skin and clothing, (2) to avoid splashing, running and spreading to adjoining areas, and (3) to protect other workmen in the area. An etching time of 30 to 60 min is generally satisfactory. The presence of an anodic film will increase the time required. It has been found that fatigue cracks are more readily visible on a machined or polished surface when etching has advanced to the stage where the grain pattern of the alloy is in evidence. Excess caustic is removed by wiping with a damp cloth or by flushing with water. Caustic-insoluble residue in removed by swabbing with 1:1 nitric acid, followed by careful rinsing with water or a wet cloth.

Light polishing of the surface to be etched speeds and makes less difficult the detecting of fatigue damage. Polishing with a fine abrasive paper removes scratches, tool marks and other surface imperfections that interfere or may be mistaken for fatigue cracks. Illumination is important in this work. Small fluorescent lights have given excellent results. The position of the lamp with respect to the area being examined should be changed frequently during examination. With experience, fatigue cracks are identified without great difficulty. They frequently occur in a series or group rather than singly, are usually perpendicular to the direction of major stress and show a tendency to jump suddenly from one level to another.

Fatigue cracks are always narrow at the point of deepest penetration so that if viewed along a line perpendicular to the direction of the crack, they will appear dark. Most surface imperfections give some light reflection from their bases when viewed in this manner. In case of doubt as to whether a fatigue crack or a surface imperfection is present, the surface should be polished lightly and the etching procedure repeated. Surface imperfections will disappear while fatigue cracks of any depth will reappear.

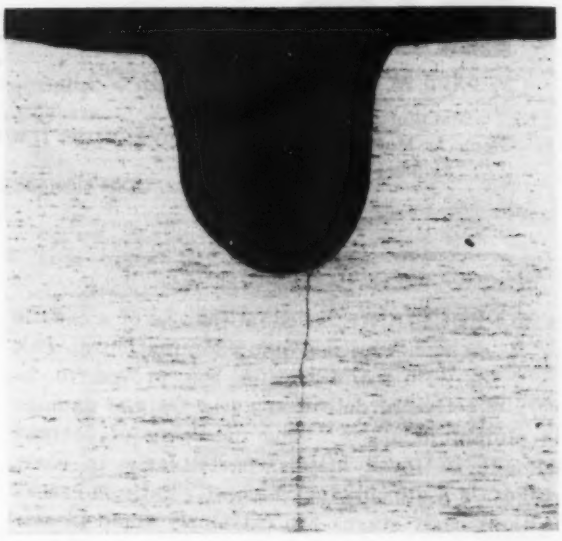

FIG. 3—The caustic etch on a fatigue crack in an aluminum alloy test specimen shows the widening of the crack at the end near the surface.

The value of caustic etching stems from the fact that cracks are widened by the etch. Fatigue cracks in early stages are tightly closed. This condition makes it difficult to detect them by inspection methods that depend upon penetration of a liquid into the crevice. In the case of caustic etching, there is vigorous attack, which begins at the surface and gradually works more deeply into the crack. The crack is increased in width until it is easily seen when viewed with a low power microscope. Fig. 3 shows the effect of the caustic etch on a fatigue crack in one of the high strength aluminum alloys. Note the widening of the crack at and near the surface in this cross-sectional view.

In contrast to the caustic etching treatment necessary for inspection of aluminum alloy parts, an acid treatment must be used for successful detection of fatigue cracks in ferrous metals. The widely used macroetch technique employing hot 1:1 hydrochloric acid appears to be the most useful method for the early detection of fatigue damage in steel.

Acknowledgment

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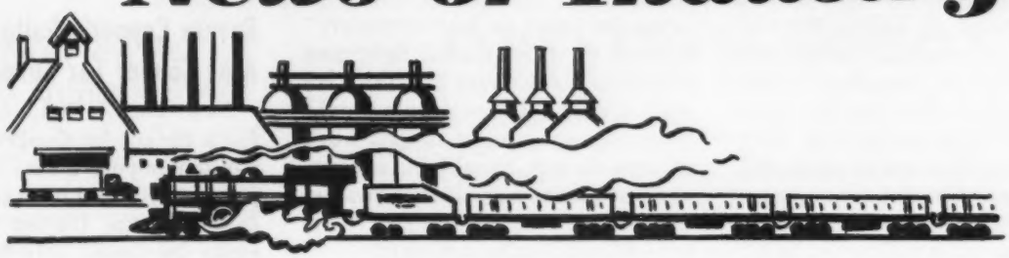
News of Industry



Murray and Reuther Pledge Joint Action

Pledge mutual fight for guaranteed annual wage, bigger pensions, union shop . . . White collar workers of U. S. Steel get retroactive wage boosts—*By BILL PACKARD*

Atlantic City—Walter Reuther, president of United Auto Workers, signed an agreement ending the bitter Chrysler strike just in time to take a few bows at the fifth constitutional convention of the United Steelworkers of America held here last week.

But more important to industry, he exchanged pledges of joint action and mutual support with Phil Murray, who is president of the steelworkers' union as well as of the CIO. The steel and auto unions are the two biggest affiliates of the CIO.

Bigger Demands Seen

These pledges between powerful Mr. Murray and militant Mr. Reuther forecast efforts to consolidate past gains and an ever-widening circle of future demands. They signal that industry will be asked for: (1) A guaranteed annual wage, (2) more pensions and social security, (3) the union shop.

This exchange of pledges marks a long step toward full cooperation between these two big unions which boast more than a million and a half members. It also publicly proclaims friendly relations between Mr. Murray and Mr. Reuther.

Design for Harmony

Another move toward harmony among unions was Mr. Murray's forecast that the CIO would appoint a committee to explore the possibility of unity with the AFL. He clearly stated that disagreement over whether this unity should follow the path of physical merger (AFL view) or political action (CIO view) would not preclude peace talks. This was a popular subject with the 2200 delegates.

Gets White Collar Rise

Mr. Murray also beat U. S. Steel Corp. by one day in announcing retroactive pay increases for white collar workers of its subsidiaries. This is the climax of a long study by the companies and the union aimed at eliminating job inequities. The study was undertaken as a result of a 1944 War Labor Board directive. Adjustments were made for hourly rated employees in 1947.

The agreements, affecting about 6000 plant-salaried employees, are based on the principle of "fair pay for fair performance." Employees are grouped into 17 general salary classifications. Pay scales will range from $83.00 to $198.20 for a 2-week period. Training and development rates will be applied to each job. Cost to the corporation of retroactive pay is estimated at $5 million. The new scales will go into effect soon after July 15.

Barkley and Tobin Speak

Mr. Murray hailed these agreements, the first ever concluded for salaried workers in a basic industry, as a major breakthrough in the area where unions have made least headway. He predicted that similar contracts covering 75,000 to 100,000 more white collar employees would be concluded with other steel firms.

The steelworkers were also addressed by Vice-President Barkley

Highlights of Steelworkers' Convention

Atlantic City—Here are the news highlights emerging from the United Steelworkers' convention held here last week:

(1) Phil Murray and Walter Reuther pledged a joint fight for a guaranteed annual wage. This was set forth as a long-term goal.

(2) U. S. Steel subsidiaries and the steelworkers' union reached agreement on retroactive pay for white collar workers which will cost the corporation $5 million.

(3) General Motors was forewarned that: (a) Mr. Reuther will insist on bigger pensions and the union shop and (b) Mr. Murray will back Mr. Reuther with the steel union's treasury of $8,687,000.

(4) Mr. Murray forecast that the CIO will seek unity with the AFL.

(5) He also told steel union locals to get ready for NLRB elections on the union shop.

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and Secretary of Labor Maurice Tobin. Mr. Barkley said he doubted that the present congress would repeal the Taft-Hartley Law and urged the steelworkers to help elect a Fair Deal congress to get the job done. Mr. Tobin congratulated the union on its "exemplary" conduct in the pension fight and resultant steel strike last fall. He also said he believed people should have the opportunity to quit work at age 65 but should be encouraged to stay at work if they choose.

Ore Flow Awaited to Save Production Pace

Present skimpiness of ore piles will not halt full blast operation of major producers . . . Ore will come in time . . . Some independents forced to cut output to some extent.

Chicago—The imminent thaw of the Great Lakes is permitting the first trickles of iron ore to steel producers in time to keep intact their full blast operation schedules. Although producers are scraping the bottom of their ore heaps they have shed the worried look so prevalent last month when they had one eye on their stocks and the other on the ice-blocked lakes.

To Keep 100 Pct Operation

Then it was feared that ore piles would reach such a state of depletion as to slow the vigorous production pace before the lakes became navigable. Now it is believed that the major steel companies will hurdle the present dearth of ore without lowering operating rates that have been over the 100 pct mark.

Independent producers of iron have already been forced to curtail to some extent on output. Within the past 2 weeks, independent furnaces have not been meeting their delivery dates. In some cases here they are 2 to 3 weeks behind on their delivery pledges. All will be remedied when the ore comes through en masse, it is felt.

Buys From Others

United States Steel has met the problem of keeping the two largest steel mills in the world operating at full blast by buying ore from other producers in the neighborhood. It still must scramble for its ore but a little sunlight has entered the picture.

U. S. Steel got its first batch of ore this season on May 3. From May 3 through 6 it received a shade more than 100,000 tons from the south Chicago and Gary docks. First delivery in '49 was made about Apr. 1. In 3 days the firm had piled up 1.5 million tons of ore.

Inland Steel's giant ore carrier, the *Wilfred B. Sykes,* is expected this week with a cargo, to make the third thus far for the company.

ASTE Holds "Connecticut Nite"

Stamford, Conn.—The Connecticut chapters of the American Society of Tool Engineers recently held a meeting and banquet here which was attended by more than 500. Mr. Payson Blanchard spoke on "The Economics of Small Lot Production" and Mr. William A. Purtell on the tool engineer's contribution to Connecticut's prosperity.

"I'll sure be glad when this coil steel spring contract is finished."

Revere Copper's Dallas Asks Copper Tax Suspension

New York—Held in abeyance for a decade by Congress, the $40 per ton import excise tax on copper needed to fill a consumption deficit in the United States will again be levied effective July 1, 1950, unless Congressional intervention continues, warned C. Donald Dallas, chairman of the board, Revere Copper and Brass, Inc., last week. He urged suspension of the tax once more.

In a letter to Sen. Walter F. George (D.), chairman of the Senate Finance Committee, he commented on the senselessness of the tariff when domestic mines can produce only about 65 pct of copper required by American industry.

Control Supply, Price

He noted that a few companies produce about 85 pct of all domestically mined copper and control about 70 pct of fabrication through integrated companies. With this setup they can control not only the supply but also the price of copper, he continued.

"The availability of adequate imports is not only a protection to the American public in terms of price of the finished product, but suspension of the tax saves American consumers at least $150 million per year in the copper of the finished product," said Mr. Dallas.

He cautioned that reactivation of the tariff, imposed by Congress in 1932 when America was a copper exporter, would inevitably hamper the orderly and continuous supply of the metal. On Mar. 31, 1950 copper refined stocks were 60,276 tons, or less than one-half month's supply on the basis of deliveries to fabricators.

B & W Delivers Huge Steam Drum

New York—Built in Barberton, Ohio, the 116 ton steam drum for what is reportedly the world's largest boiler was delivered to the Hudson Avenue (Brooklyn) electric generating station of Consolidated Edison Co. of New York, Inc., by the Babcock & Wilcox Co.

Republic Official Sees Ore From Liberia Arriving Next May

Flemington, N. J. — The first shipload of ore from Republic Steel Corp.'s Liberian deposit may reach this country by May 1951 —well ahead of schedule, said T. M. Girdler, chairman, at the stockholders' 20th annual meeting.

Hopes for early shipment are strong because 16 miles of the 43-mile railroad now under construction between the Free Port of Monrovia and the Bomi Hills deposit are now complete, he said. Also being built is a dockside belt conveyor loading system.

Mr. Girdler stated that he viewed steel's future with "considerable optimism" and that business would continue to be good at least through the third quarter of 1950. He proposed that the government change tax laws to permit steel to spend more for exploration and development of new ore sources and to encourage investments in taconite plants.

Inventories Increase

Washington—Retail inventories, except for motor vehicles, increased generally during March, while manufacturers' stocks remained unchanged, the Office of Business Economics reports. Total business inventories on April 1 stood at $55 billion, $½ billion above February.

To Build Compressors

Chicago—The Paramount Compressor Corp., Chicago, will now manufacture the portable air compressors formerly made by the Compressor Corp. of America. Paramount's marketing program is aimed at hardware, automotive, mill supply, and farm equipment jobbers.

Imperial Orders More Turbines

Philadelphia—The Imperial Irrigation District, Imperial, Calif., has ordered two 7500-hp hydraulic turbines at a cost of more than $600,000 from the Baldwin Locomotive Works of this city.

INDUSTRIAL SHORTS

HARTER HONORED — Isaac Harter, chairman of the board, Babcock & Wilcox Tube Co., has been named a Fellow of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS. The grade of Fellow is conferred upon engineers with at least 25 years of active practice or teaching experience in a school of accepted standing and with acknowledged engineering attainment.

OPEN HOUSE—The Stamford Research Laboratories of AMERICAN CYANAMID CO. at Stamford, Conn., will hold an Open House on May 19 for the families and friends of employees, specially invited guests and the press.

BETTER SERVICE — A new sales and service office has been opened in Rochester by SCOVILL MFG. CO., Waterbury, Conn., to represent its mill products, manufacturing and button and fastener divisions. The Syracuse office has been closed.

ABRASIVE SALES — Eugene B. O'Connor has formed the O'CONNOR ABRASIVE SALES at 277 Military Road, Buffalo. Mr. O'Connor is the New York State and northwest Pennsylvania representative for Waltham grinding wheels, Pellets, Inc., and other abrasive lines.

MORE HOISTS—The National Truck Equipment Co., Waukesha, Wis., has been acquired by the NATIONAL LIFT CO., a wholly owned subsidiary of Gar Wood Industries, Inc., Wayne, Mich., manufacturers of hydraulic hoists and truck equipment.

NEW YARD FACILITIES — Complete yard facilities for the handling and processing of scrap iron, metal and steel, has been purchased by M. BERKOWITZ & CO., INC. The property has a main office, yard and warehouse at 1111 W. Rayen Ave., Youngstown.

EXPANDING—Acquisition of a plant in Clinton, Ill., for the production of Revere Ware copper clad stainless steel cooking utensils, has been made by REVERE COPPER & BRASS, INC. They plan to make an addition to the plant, which consists of approximately 65,000 sq ft and 48½ acres of land. The plant will be in operation by September 1950.

ENROLL NOW—A Salesmanship for Engineers training program to teach engineers selling skills and market procedure will open at the CITY COLLEGE SCHOOL OF BUSINESS, New York, on June 19. Instruction will total 300 hr in 15 weeks of day or 25 weeks of evening classes.

MERGES—The Superior Metal Products Co. has been merged with its affiliate JOHN WOOD CO. and is now operating as the John Wood Co., Superior Metalware Div. at St. Paul. The management and personnel will continue without change.

TAKES OVER — The Freezer Div. of the Whiting Corp., Harvey Ill., has been purchased by the BALTIMORE PORCELAIN STEEL CORP., Baltimore. The Whiting Appliance Co. will be formed as an operating subsidiary of Baltimore Porcelain Steel to manufacture the complete freezer line and a room cooler, at Baltimore, and to market a complete line of Whiting household appliances.

NEW MARKET—The Erie Malleable Iron Co., Erie, Pa., producers of malleable iron and pearlitic iron castings, has appointed ALLMON STEEL CO., Products Div., Pittsburgh, as their exclusive sales representative in that area.

BUYS PLANT—A $1 million government-built plant has been purchased from the General Services Administration by the ELECTRIC EQUIPMENT CO., Rochester

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Franco-German Steel-Coal Pool Sought

French ask pooling of basic industries . . . May eventually include all basic production of Europe . . . Soviet cohort countries to be invited . . . U. S. Approves . . . England mildly.

London—In a surprise move last week the French Cabinet adopted and immediately made public a proposal to pool the steel and coal production of France and Germany. If the proposal catches on, it could mean integration of these basic industries throughout Europe.

The proposal provides for a single authority to supervise and coordinate production of these basic industries in the two countries. It is aimed primarily at solving the German problem by including Western Germany within the framework of some larger organization. It will be recalled that the French also proposed the Council of Europe and the Atlantic Council.

Keeps Private Ownership

Specifically, all steel and coal producing countries on both sides of the Iron Curtain would be asked to adhere to the plan. The United Nations would also be represented on the joint commission. The French emphasized that private ownership would stay and that individual property rights would be respected.

England Approves Mildly

Depending on reaction of the governments of Britain and the United States, the French proposal for pooling of basic industires would invite participation of other European countries which cared to join. Under the present plan membership in the international authority would also be open to Russian satellites in Eastern Europe.

As things stand now, the Western German government could not take part in such a plan without the consent of Britain and the U. S. Reaction so far is like this: (1) United States—Secretary of State Dean Acheson (in London) immediately expressed "sympathy and approval." "It is plain . . . the spirit was the furtherance of . . . progress toward the economic integration of Western Europe," he said.

(2) The British Labor Government was politely non-commital. It gave a mild type of approval in spirit, with a wait-and-see attitude. But liberal and conservative opposition was expected to call for a more solid endorsement.

Long a Hot Spot

Problems of European integration have long baffled Marshall Plan officials, including Paul Hoffman, ECA administrator. In this respect the aim has been much clearer than the means for accomplishing it. The French proposal is designed to provide the means.

Ruhr coal and Lorrain ore have worked together for many years to provide a large portion of the basic steel needs of Europe. They have also been festering sores which have bred covetousness and wars ever since iron and steel became vital to a nation's economy. Historically, these areas have provided the tools to fight the wars to determine how the raw material pie was to be divided.

March Finished Steel Shipments

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	Item	March					To Date This Year				
		Carbon	Alloy	Stainless	Total	Percent of Total Shipments	Carbon	Alloy	Stainless	Total	Percent of Total Shipments
Ingots	1A	56,739	7,934	1,780	66,473	1.2	• 121,823	26,126	4,102	• 152,051	0.9
Blooms, slabs, billets, tube rounds, sheet bars, etc.	1B	130,536	32,362	762	163,660	2.9	430,054	95,349	2,121	527,524	3.8
Skelp	2	2,369	-	-	2,369	-	23,114	-	-	23,114	0.1
Wire rods	3	69,447	1,806	101	71,354	1.2	199,073	4,152	311	203,536	1.2
Structural shapes (heavy)	4	328,781	2,481	74	331,336	5.8	955,626	9,492	76	965,194	5.9
Steel piling	5	24,114	-	-	24,114	0.4	58,850	-	-	58,850	0.4
Plates	6	439,281	9,502	1,002	440,785	7.7	1,209,984	30,709	2,511	1,241,204	7.6
Rails—Standard (over 60 lbs.)	7	116,759	-	-	116,759	2.0	374,090	8	-	374,098	2.3
Rails—All other	8	8,293	17	-	8,310	0.1	26,289	70	-	26,359	0.2
Joint bars	9	8,807	-	-	8,807	0.2	25,379	-	-	25,379	0.2
Tie plates	10	39,503	-	-	39,503	0.7	92,738	-	-	92,738	0.6
Track spikes	11	10,676	-	-	10,676	0.2	29,036	-	-	29,036	0.2
Wheels (rolled & forged)	12	19,771	8	-	19,779	0.3	52,798	23	-	52,821	0.3
Axles	13	6,919	73	-	6,992	0.1	15,515	221	-	15,736	0.1
Bars—Hot rolled (incl. light shapes)	14	484,606	164,437	2,584	651,627	11.4	1,404,192	462,577	6,415	1,873,184	11.5
Bars—Reinforcing	15	116,305	-	-	116,305	2.0	338,888	-	-	338,888	2.1
Bars—Cold finished	16	108,217	21,162	2,020	131,399	2.3	296,800	55,402	5,627	357,829	2.2
Bars—Tool Steel	17	1,425	5,639	-	7,064	0.1	• 3,649	• 15,188	-	18,837	0.1
Standard pipe	18	183,785	-	-	183,785	3.2	570,513	-	3	570,516	3.5
Oil country goods	19	112,625	16,665	-	129,290	2.3	337,998	48,965	-	386,963	2.4
Line pipe	20	266,209	-	-	266,209	4.7	792,088	-	-	792,088	4.8
Mechanical tubing	21	41,548	17,164	186	58,898	1.0	108,450	• 43,608	640	• 152,698	0.9
Pressure tubing	22	17,008	2,123	567	19,698	0.3	50,956	• 6,786	1,679	• 59,421	0.4
Wire—Drawn	23	239,411	3,335	1,818	244,564	4.3	680,722	8,828	4,818	694,368	4.3
Wire—Nails & staples	24	77,000	-4	7	77,003	1.3	218,921	-	33	218,954	1.3
Wire—Barbed & twisted	25	20,839	-	-	20,839	0.4	55,099	-	-	55,099	0.3
Wire—Woven wire fence	26	45,094	-	-	45,094	0.8	113,403	-	-	113,403	0.7
Wire—Bale tie	27	4,761	-	-	4,761	0.1	10,290	-	-	10,290	0.1
Black plate	28	40,663	-	-	40,663	0.7	118,299	-	-	118,299	0.7
Tin & terne plate—hot dipped	29	140,823	-	-	140,823	2.5	426,414	-	-	426,414	2.6
Tin plate—Electrolytic	30	221,999	-	-	221,999	3.9	613,431	-	-	613,431	3.8
Sheets—Hot rolled	31	613,537	19,133	1,869	634,539	11.1	1,732,327	51,276	6,349	1,789,952	11.0
Sheets—Cold rolled	32	766,210	7,541	8,935	782,686	13.7	2,120,548	21,095	24,194	2,165,837	13.3
Sheets—Galvanized	33	204,758	2,711	-	207,469	3.6	570,587	6,253	-	576,840	3.5
Sheets—All other coated	34	19,157	-	-	19,157	0.3	52,303	-	-	52,303	0.3
Sheets—Enameling	35	20,130	-	-	20,130	0.4	54,089	-	-	54,089	0.3
Electrical sheets & strip	36	7,735	47,504	-	55,239	1.0	21,289	132,992	-	154,281	0.9
Strip—Hot rolled	37	177,427	3,964	1,107	182,498	3.2	512,026	11,750	2,076	525,852	3.2
Strip—Cold rolled	38	135,630	959	14,095	150,684	2.6	390,071	2,803	39,652	432,526	2.6
TOTAL	...	5,319,917	366,516	36,907	5,723,340	100.0	•15,807,662	•2,033,673	100,607	•16,341,942	100.0

During 1949 the companies included above represented 99.4% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

• Revised.

U.S. Steel Industry Seen Little Influenced by Pooling

New York—Acceptance of the French proposal probably would not greatly affect the steel industry in this country one way or the other. As one official pointed out, "The production facilities and resources are there, and it won't make much difference to us in the long run . . . whether they are operated as a pool or separately. But if this can prevent future wars from starting in Europe, we might even favor it."

Steel exports from this country are now at about the rate of 3 pct of total production. Exporters feel that their business can't get much worse. That such an authority might even prevent some of the price cutting going on now.

In checking industry reaction

here, THE IRON AGE did not encounter any fear that Europe's prewar industrial cartel would be replaced by a government cartel. On this point one spokesman got in a humorous twist by suggesting that they might have to resort to a basing point method of pricing in order to avoid actual price setting by the authority.

Industry Gains 12 Pct

Boston — Massachusetts industrial activity in March was 12 pct more than that of a year ago. The index figure was 46.6 pct above the average of 1925-27. Industrial employment was 2.9 pct under March 1949 and payrolls were 1.2 pct higher.

Annecy Agreement Set for May 30

Washington—Tariff reductions agreed upon at Annecy last year between the United States and Italy become effective May 30. Major reductions granted by Italy on industrial goods were on automobiles, trucks, tires, tubes, and tractors.

Celler Readies Antitrust Traps for Steel

His bills propose new weapons for Justice Dept. to trip steel on monopoly charges . . . Steelman sees Federal controls killing competition in industry—*By GEORGE BAKER*

Washington — Legislation paving the way toward new antitrust suits against the steel industry was being drafted on Capitol Hill this week.

Chairman Celler, D., N. Y., of a House monopoly investigating group is sponsoring bills which would enable the Justice Dept. to open up an entirely new field of prosecution under Federal antimonopoly laws.

Plans 1951 Passage

Mr. Celler believes that the "power to monopolize" of any company should be sufficient to warrant institution of dissolution or divestiture suits such as the Justice Dept. now has pending against the A & P grocery chain.

While he admits little chance exists that such legislation will pass Congress this year, the self-styled "trust-buster" made it clear last week that he believes such a bill may be enacted in 1951.

Fatal in Peace

Congressional hearings on charges that the nation's largest steel producers constitute a monopoly threat to the economy were brought to a close by the Celler subcommittee last week with fabricators' protests against the "unsound criticism of big business."

Robert S. Waters, president, National Radiator Co., told the committee he would offer no objection if breaking up big companies would insure over-all improvement for the economy.

"But it will not do so," he declared. "It would result in the imposition of governmental re-

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to American Iron & Steel Institute

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated Weekly Production (Net Tons)	Number of Weeks in Month
	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity		
January, 1950	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,152	4.43
February	6,142,178	92.0	255,565	60.2	395,502	75.0	6,793,245	89.1	1,698,311	4.00
*March	6,747,680	91.3	265,726	56.5	473,630	81.1	7,487,036	88.7	1,690,076	4.43
*1st Quarter	20,021,377	93.3	900,543	65.9	1,288,733	76.0	22,210,653	90.6	1,727,111	12.86
†April	7,301,284	102.0	407,909	89.5	486,857	86.1	8,196,050	100.2	1,910,501	4.29
May	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.43

Note—The percentages of capacity operated are calculated on weekly capacities of 1,668,287 net tons open hearth, 106,195 net tons Bessemer and 131,786 net tons electric ingots and steel for castings, total 1,906,268 net tons; based on annual capacities as of January 1, 1950 as follows: Open hearth 86, 984,490 net tons, Bessemer 5,537,000 net tons, Electric 6,871,310 net tons, total 99,392,800 net tons.
* Revised.
† Preliminary figures subject to revision.

January, 1949	7,299,865	101.2	408,552	92.6	498,973	96.1	8,197,390	100.4	1,850,427	4.43
February	6,635,765	102.0	379,698	95.3	478,479	102.0	7,493,942	101.6	1,673,485	4.00
March	7,476,139	103.7	430,176	97.5	495,481	95.4	8,401,796	102.9	1,896,568	4.43
1st Quarter	21,401,769	102.3	1,218,426	95.2	1,472,933	97.7	24,093,128	101.6	1,873,494	12.86
April	7,017,712	100.6	404,095	94.6	374,358	74.4	7,796,165	98.6	1,817,288	4.29
May	6,891,293	95.6	400,741	90.9	306,956	59.1	7,598,990	93.0	1,715,348	4.43
June	5,956,402	85.4	349,196	81.8	199,058	39.6	6,504,656	82.2	1,516,237	4.29
2nd Quarter	19,865,407	93.9	1,154,032	89.1	880,372	57.7	21,899,811	91.3	1,683,306	13.01
1st 6 months	41,267,176	98.1	2,372,458	92.1	2,353,305	77.6	45,992,939	96.4	1,777,848	25.87
July	5,309,060	73.8	300,236	68.2	175,535	33.9	5,784,831	71.0	1,306,785	4.42
August	6,103,326	84.7	355,335	80.6	264,110	50.9	6,722,771	82.3	1,517,556	4.43
September	5,994,100	86.1	350,282	82.2	253,553	50.5	6,597,935	83.6	1,541,574	4.28
3rd Quarter	17,406,486	81.5	1,005,853	76.9	693,198	45.0	19,105,537	78.9	1,455,106	13.13
9 months	58,673,662	92.5	3,378,311	87.0	3,046,503	66.6	65,098,476	90.5	1,669,192	39.00
October	814,618	11.3	.....	.....	113,729	21.9	928,347	11.4	209,559	4.43
November	3,806,870	54.6	172,270	40.3	243,989	48.5	4,223,129	53.4	984,412	4.29
December	6,953,653	96.7	396,075	90.0	378,496	73.0	7,728,224	94.8	1,748,467	4.42
4th Quarter	11,575,141	54.2	568,345	43.4	736,214	47.8	12,879,700	53.2	980,190	13.14
2nd 6 months	28,981,627	67.8	1,574,198	60.2	1,429,412	46.4	31,985,237	66.0	1,217,558	26.27
Total	70,248,803	82.8	3,946,656	76.0	3,782,717	61.9	77,978,176	81.1	1,495,554	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons Bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of January 1, 1949 as follows: Open hearth 84,617,040 net tons, Bessemer 5,191,000 net tons, Electric 6,112,890 net tons, total 96,120,930 net tons.
* Revised January through December, 1949.

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strictions of a character which can be tolerated in war, but which would be fatal in time of peace."

Edwin Hodge, Jr., president, Pittsburgh Forgings Co. and the Greenville Steel Car Co., predicted that government controls over the steel industry would "end competition in steel manufacture, and only a little later in steel fabrication."

"If you regulate and fix the prices of steel products, can you long avoid regulating the prices of the things that go to make steel —iron ore, limestone, and coal? Can you avoid fixing the prices of things made of steel—automobiles and railroad cars—and then such things as drop forgings and farm implements?" he asked.

Wins Honor from Gas Assn.

W. A. Darrah, president of Continental Industrial Engineers, Inc., Chicago, has been awarded a certificate of life membership in the Hall of Flame, an honorary organization of the American Gas Assn.

The award honors him for his contributions to the welfare and progress of the gas industry through service performed in the Industrial and Commercial Gas Section of A.G.A.

ECA Spends $9 Billion; $3.5 Million for Fiat Works

Washington—Marshall Plan expenditures recently passed the $9 billion mark 25 months after the plan went into effect. About 47 pct, or $4.2 billion went for industrial goods.

ECA funds of $3.5 million will finance the last half of the steel plant modernization program of the Fiat works in Italy (THE IRON AGE, Aug. 4, 1949, p. 141).

Lake Freighters Get Radar

Chicago—Radar equipment outfitting of all 61 of the Pittsburgh Steamship Co.'s lake freighters was completed recently with the installation of the navigation aids in the last nine vessels, said Walter C. Hemingway, president. The five year program is aimed at minimizing danger from collision and grounding.

Will Consult on Metals

Washington—A. W. Mace, associated for 40 years with the steel industry, has come out of retirement to become a Washington consultant on ferrous and nonferrous metals.

This was incorrectly stated in the Apr. 6 issue which said he had been appointed Washington consultant.

Of course, Mr. Mace is now an independent consultant whose services are not committed but are available for special assignments.

SSIRCO Builds 13th Plant

Memphis, Tenn.—The thirteenth southern branch of the Southern States Iron Roofing Co., a 40,000-sq ft brick on steel plant and distributing warehouse built at a cost of $135,000, is now in operation here.

The firm manufactures aluminum, steel roofing, and building products. Hanker & Heyer were the architects and the TriState Construction Co., the general contractors. M. L. Pekk is manager.

Army Contracts Awarded

Washington — Army contracts through May 4 included three for automotive spare parts to General Motors Corp., $592,800; United States Rubber Co., $216,560; Chrysler Corp., $673,675, and one for 75 mm top carriage roller bearings to the Torrington Co., of South Bend, $107,920.

Primary Aluminum Output Gains

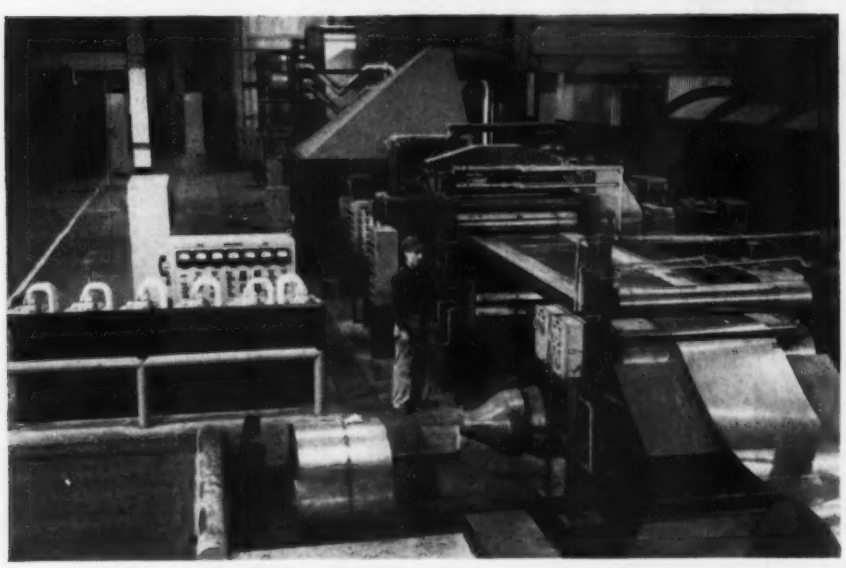
New York—Primary aluminum production in America in the first quarter of 1950 jumped 6.5 million lb to 322,425,008 lb, reports the Aluminum Assn. At that rate of production, total 1950 output will be 645,000 short tons, for the most productive postwar year.

Shipments of sheet, plate, and strip by association members were 259,772,157 lb, a slight rise over the 1949 first quarter.

U. S. Imports Natural Cryolite

Washington—Supplementing its own manufacture of artificial cryolite, the United States last year obtained 15,000 tons or more than half of the 27,500 tons of the natural product mined by Greenland —the only country to mine it commercially. The remainder went to Denmark for refining and reexport.

DOUBLE DUTY: A coil of cold rolled steel rolls over the new 600-ft long galvanizing line at U. S. Steel's Gary Sheet and Tin Mill which heat treats and galvanizes steel continuously at 300 fpm in widths up to 48-in. Production capacity is 60,000 tons a year.



"Maintain High Scrap Quality," Says Barringer

Philadelphia — The importance of keeping high standards for scrap quality was stressed by Edwin C. Barringer, executive vice-president of the Institute of Scrap Iron & Steel, Inc., in a recent address before the Philadelphia chapter of the Institute.

With the present demand pressure, harmony between the steel and scrap industries can best be achieved by maintaining scrap quality, and consumers will be able to use a higher percentage of purchased scrap, stated Mr. Barringer. He also pointed out that special incentives for workmen to remove nonferrous metals are advisable.

Consumption of purchased scrap is close to the all-time high of 2,600,000 gross tons for March 1949, said Barringer.

May Import Bauxite

Washington—In the long run, Australia's infant aluminum industry may find it cheaper to import bauxite ore than to mine it from the recently surveyed deposits of New South Wales.

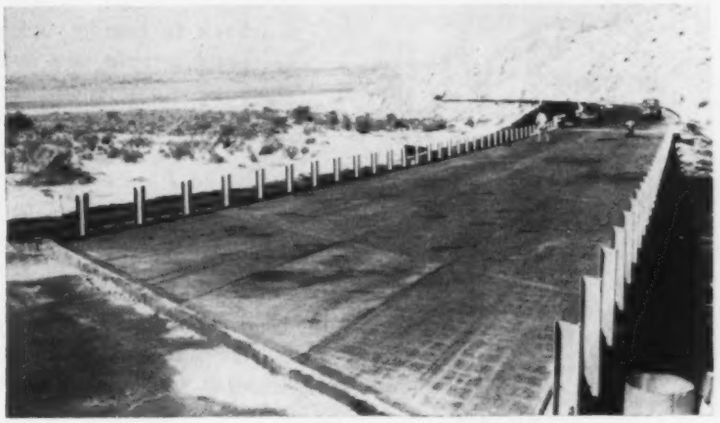
Proven ore reserves in New South Wales approximate 7,750,000 long tons. But the drop in ocean freight rates, coupled with rising Australian transport rates, is seen as a disadvantage to local mining.

Standard Oil Buys in Italy

Washington—On an ECA guarantee that its $12 million investment, plus $2.5 million in earnings, can be converted to dollars, Standard Oil Co. of New Jersey has purchased a half-interest in an Italian refining company, STANIC. Standard's investment is the largest ECA industrial guarantee to be signed.

Erie Orders Baldwin Locomotives

Philadelphia—Five 1500-hp diesel-electric road switching locomotives have been ordered from the Baldwin Locomotive Works by Lake Erie Railroad Co.



Novel Bridge Uses Steel Decking

Los Angeles—Welded steel prefabricated panels, weighing about two and one half tons, replace wood in the new type of bridge shown above before addition of blacktop and guard rails. The panels, built and erected by the Los Angeles Fabricating Works of Bethlehem Pacific Coast Steel Corp., consist of steel plate, channels, and I beams welded into standard sections.

Advantages claimed for this type bridge are lower cost, more rapid installation, less maintenance, and full recovery and re-use in the event of relocation. Elimination of an expensive detour is possible by replacing only one lane of the existing roadway at a time.

In the event of temporary detour crossings the bridge is suitable, on appropriate piers, without any surfacing.

Ore Production Stays on '47 Level; Gains 20 pct Over 1935

Washington — Production of usable iron ore per manhour in 1948 remained at substantially 1947 levels—20 pct above 1935, the earliest year included in a new productivity study issued by the Bureau of Labor Statistics.

Output per manhour was 6 pct above 1939 and 9 pct above the low point reached in 1943.

Form New Warehouse Firm

Cleveland—A new steel warehouse firm, Cardinal Steel Supply Co., has been formed here by John W. Schlendorf and George P. Lenz, Jr. A sales office has been opened at 10006 Carnegie Ave. and a warehouse containing 20,000 sq ft of floor space at 7921 Euclid Ave.

The company will handle hot and cold rolled sheets, strip and plate. Mr. Schlendorf, formerly a vice president of Nottingham Steel Co., is president, and Mr. Lenz, formerly assistant sales manager of Nottingham Steel Co., is secretary-treasurer.

H. Kramer & Co. Production Capacity Rises with Ajax Buy

Philadelphia—By the purchase of the Ajax Metal Co., Philadelphia, H. Kramer & Co., Chicago, becomes a still greater factor in the nonferrous ingot metal industry. The Philadelphia plant will operate as the Ajax Metal Div., H. Kramer & Co., producing brass and bronze ingots, phosphor copper, babbitts and other alloys. M. L. Chapman, president, H. Kramer & Co., says that there is no plan to make changes in operations or personnel. E. A. Ginkinger has been elected vice-

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president and general manager of the Ajax Metal Div.

Dr. G. H. Clamer, president, Ajax Metal Co., states that the company is changing its name to Ajax Electro Metallurgical Corp. and will continue with its associated companies in the manufacture of electric furnaces and equipment used in the metallurgical field. These companies include Ajax Electric Furnace Corp., Ajax Electrothermic Corp., Ajax Electric Co., Inc., and Ajax Engineering Corp.

Townsend Chicago Plant Expansion Doubles Capacity

New Brighton, Pa.—With completion of an expansion program doubling the capacity and increasing the variety of items produced at its Chicago plant, Townsend Co. is maintaining a combined daily production of 60 million fasteners and parts in Chicago and New Brighton.

F. R. Dickenson, president, said the Chicago expansion will enable the company to better serve Midwest customers with a complete line of cold headed products including large and small solid rivets, gadgets, and a variety of other fasteners and small parts.

Designed and built by the H. K. Ferguson Co., the Chicago plant addition included construction of a new bay with 12,000 sq ft of floor space and installation of new machinery. Townsend acquired the plant in 1928.

The company is the world's largest manufacturer of solid rivets and, having been founded in 1816 at Pittsburgh, is the oldest firm in the cold heading industry.

Spain Plans Aluminum Plant

Washington—The Spanish industrial program for 1950-51 includes construction of a new aluminum plant having a capacity of 5000 metric tons, according to diplomatic reports. Subsequent progress toward solution of power problems is expected to increase capacity and production.

Metals Producers Seek Tariff Protection

Seek to bar import of heavy tonnages of foreign metal . . . Lead people say imports demoralized market last year . . . Seek aluminum protection too—*By JOHN ANTHONY*

New York—Metal producers have set the wheels in motion to obtain tariff protection for the domestic metal mining industry against invasions of heavy tonnages of foreign metals and ores such as began in 1949. The wave of foreign currency devaluations last year, in effect, has subsidized exports to the United States.

Hard Blow Struck

Heavy imports of foreign lead early last year are generally considered to have been one of the principal factors demoralizing the domestic metal markets in 1949. Domestic mine production of copper, lead and zinc has never fully recovered from this set-back and mineral reserves have been lost.

Last week an Emergency Lead Committee of 21 producers filed a petition with the U. S. Tariff Commission for relief under the escape clause of the 1943 Mexican Trade Agreement. An upward revision of the tariff on lead and concentrates is recommended to 2¼¢ per lb of contained lead from the present rate of ¾¢.

"That's Sen. Blatheringskite. He says that he has a right to some publicity without being put in charge of an investigating committee."

Tariff Down 50 Pct

The recommended rate on lead in the form of bullion and metal is 3 3/16¢ per lb, compared with the present rate of 1.06¢. Present rates represent a 50 pct reduction from the 1930 tariffs.

The petition cites the serious injury to the lead mining industry suffered from an unprecedented peacetime flood of lead from Mexico, Canada, Australia, Peru, Germany and Yugoslavia. United States lead imports in 1949 almost equaled domestic production, 98.9 pct, exceeded only in 1942 under the stimulus of war. Imports in 1939 were only 21 pct of domestic production.

Canada Competition

The first higher tariffs move was taken in March by Reynolds Metals Co. when it filed a brief with the Tariff Commission to obtain an increase in the duty on primary aluminum to 4½¢ per lb from the present rate of 2¢; and on semi-fabricated aluminum to 7¢ per lb from 3¢.

This was designed to bring relief from the competition with lower power cost Canadian aluminum. Kaiser Aluminum & Chemical Corp. took similar action.

The Reynolds brief said that since 1947, aluminum ingot imports have increased by 500 pct. Imports of aluminum sheet and other semi-fabricated products have increased to 15.8 million lb in 1949 from 100,000 lb in 1947.

Plans for Torquay

Next fall a conference of nations will be held at Torquay, England. Efforts will go toward further reductions in reciprocal tariff rates on some 2500 commodities. The American Zinc Institute is about to ask hearings before

the Committee on Reciprocity Information to prevent further tariff reductions on zinc at Torquay meetings.

The Emergency Lead Committee points to the high cost of mining operations in America. Observing that domestic wages are approximately 250 pct of prewar rates, the committee has compiled a set of comparative hourly wage rates in the U. S. and foreign lead producing countries. They are as follows: U. S., $1.56; Mexico, 30¢; Australia, $1.10 to $1.25; Canada, $1.20; Newfoundland, $1.00; Peru and Bolivia, 7¢ to 9¢; Yugoslavia, government labor; Morocco, 12¢; South Africa, 6¢ to 10¢.

Imports Needed

The need for imported lead and aluminum to supplement domestic production is recognized in briefs filed by the Emergency Lead Committee and by Reynolds Metals Co. This would be fostered by the development of flexible tariffs, in which the rate would vary inversely with the domestic price of metal.

This mechanism would assure adequate supplies of metal to consumers. A suggested scale of rates on lead would vary from 4¾¢ per lb when metal sells at 5¢ to 6¢ per lb, down to 1¼¢ when the price ranges from 19¢ to 20¢, and free above that. Under this proposal, the tariff rate on lead in ores or concentrates would be 70 pct of the metal tariff rate.

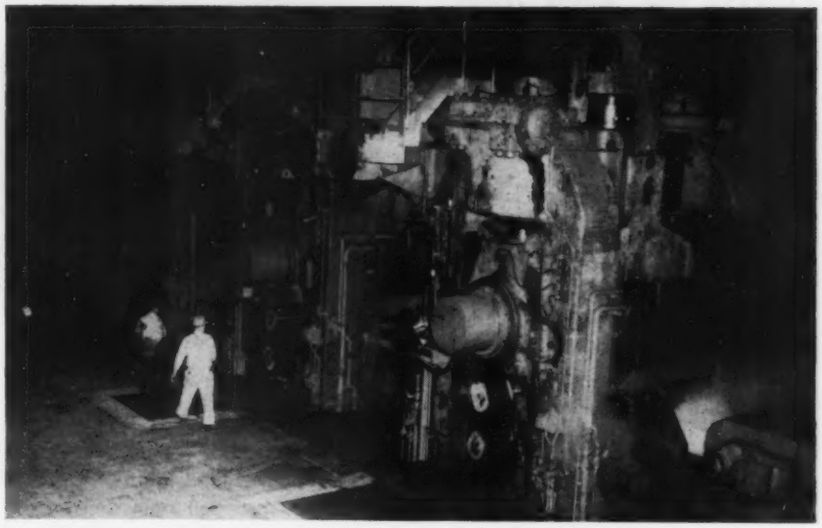
Baldwin Okays Pensions

Philadelphia—Pension plans for hourly-rated and salaried employees of the Baldwin Locomotive Works were approved at a recent stockholders' meeting.

Sees $300 Million Expenditure

New York—Present orders for anti-friction bearings indicate that the textile industry will spend more than $300 million in the next year to further its postwar program of improvement, said Richard DeMott, vice-president of SKF Industries, Inc.

Incoming orders for tape tension pulleys, spindle bolsters, and other anti-friction bearing equipment are also well ahead of last year, reported Mr. DeMott.



REDUCING TREATMENT: Slabs weighing 6000 to 8000 lb are now wending their way through four 4-high rolling stands in Kaiser's new 86-in. hot strip mill at Fontana, Calif. Shown above, a slab heated to approximately 1650°F gets the reducing treatment in one of the stands comprising four rolls, two 86-in. center contact rolls, and two heavier back-up rolls. After reduction, the slab is either coiled or cut into strip.

New Thermostat Developed

Minneapolis — A time modulation thermostat for operating heating plants has been developed by the Minneapolis-Honeywell Regulator Co. It operates at regular intervals eliminating long periods of burner operation. Relative humidity can be controlled to within 0.5 pct of the desired setting.

Another development by this company is a dribble-proof valve for oil burners for fuel savings and furnace cleaning costs cuts.

Enter Berlin Auto Show

Washington — General Motors, Ford, Chrysler, Nash, Hudson, Kaiser-Frazer, Studebaker, and Willys-Overland will display models at Berlin's first postwar International Automobile Show running from May 27 through June 4.

Correction

New York—Republic Steel Corp. earnings in the first quarter of 1950 were $16,621,334, not $13,850,000 as incorrectly listed in a comparison of earnings box published in the May 4, 1950 issue of THE IRON AGE, page 105.

Iron, Steel Haulers Strike Back with Lower Rate Schedule

Pittsburgh — Iron and steel truckers, feeling their way toward a solution of the competitive dilemma posed by the new low rail rates on 80,000 lb carload shipments, agreed at a recent meeting to file revised rate schedules to become effective June 21.

The proposed rates are not competitive with the 80,000 lb rail rates, but the way was left open for further revisions if necessary in order to win back some of the business now going to the railroads.

Producers Swing Over

The new schedule calls for two minimum rates, one on 20,000 lb shipments based on rail rates in effect prior to Jan. 11, 1949, and another on 32,000 lb minimum shipments based on existing truck rates. The latter minimum would apply only to products carried by the railroads under the 80,000 lb rate with the addition of blooms, billets and slabs.

Since institution of the 80,000 lb rail rates May 1, many steel consumers who formerly shipped by truck have been specifying rail to take advantage of the lower rail schedule.

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Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"A New Experience"

FIVE years ago the Germans threw in their hand and the war in Western Europe was over. Ever since, students and businessmen have been looking for an economic adjustment. This made sense. War involves major distortions in peacetime patterns of production and consumption. When the war is over, communities try to find their way back to normal habits. This retirement on a broad and complex economic front is usually painful. Our experience after the Napoleonic, the Civil, and the First World Wars offered precedent for the general expectation of a similar decline after the Second World War.

Nothing of the kind has happened. The dip in 1946 and another mild quiver last summer were only slight dents in a high level of prosperity. It is clear now that these were not authentic cyclical tremors preceding economic retrenchment. Today the American economy yields new and vigorous evidence that the decline in foreign aid, increasing foreign competition, satisfaction of wartime deferred demands, and general restocking have not, as yet, broken the boom. In fact, orders for heavy goods, the purchase of a record output of auto vehicles, and mounting new construction suggest that the boom has taken a new lease on life.

The reason for this erratic, if gratifying, behavior of the economy is to be found in an interesting compound of fears.

First is the fear of war. This is real. It cannot be passed off as an attempt on the part of the government to administer continuous shocks to the economy in order to keep it from sinking to normal levels. The Russians leave us no room to doubt their intentions.

We listened the other day to a former cabinet member of conspicuous ability, with exceptional sources of information, who declared that a shooting war was not probable within the next 8 to 10 years.

He gave three reasons for this conviction. The Soviet was making excellent progress without a shooting war. Secondly, they had a formidable job of digestion ahead which would keep them busy for years. Finally, the men in the Kremlin were realists and knew that they could not win a full-scale, conventional war.

This reasoning may be sound and the conclusions correct. Power politics and international diplomacy do not permit categorical answers to complex questions. That a shooting war will not occur during the next decade is a moot question. A growing portion of the business world and the consuming public is taking no chances.

It is this fear of a war which accounts for a considerable amount of business in the heavy fields. The psychology is that of a defender who is entering a fortress about to be subjected to a siege of unpredictable duration.

A second fear which is acting as a stimulant to business is the fear of inflation. The adamant refusal of the government to consider any return to a gold standard and the persistence of deficits during a boom period spell a progressive depreciation of the dollar. To anticipate a decline in the value of money by spending it now seems reasonable.

Finally, the aggressive tactics of organized labor in seeking annual increases without regard to productivity or living costs place a premium upon technological improvement. Management is disposed to "reach" for any new equipment that will cut labor costs.

Current boom levels resting on fear are a new experience for the American economy.

Pullman-Standard Orders Grow

Chicago—Of approximately 8000 new freight car orders on the books of the Pullman-Standard Car Mfg. Co., Chicago, 1800 are to be built under the Equitable Life Assurance Society's car leasing to railroads plan.

This was disclosed recently by Champ Cary, Pullman, Inc., president, in a statement to stockholders. He attributed a drop in first quarter earnings from $2,013,142 last year to $967,120 in 1950 to a lack of orders which practically shut down Pullman-Standard's car building operations in their freight car shops.

Seeks Pipe Line Permit

New York—Permission to build a 791-mile pipe line, 30-in. diameter, to feed 476,400,000 cu ft of natural gas a day to New England and its present customers in the Appalachian and Seaboard areas, is sought by the Texas Eastern Transmission Corp. The firm filed an amendment to a 1948 application with the Federal Power Commission on May 5.

NCA to Oppose Bid Legislation

New York—Resistance against legislation requiring the submission of separate bids directly to the owner on electrical, piping, and other specialty construction work was promised by the National Constructors Assn., at a recent executive committee meeting here.

Monarch Declares Dividend

Sidney, Ohio—Directors of Monarch Machine Tool Co. declared on May 2 a dividend of 50¢ per share, payable June 1, 1950, to shareholders of record at close of business May 19, 1950.

Great Lakes Steel Wins Contract

Washington—A contract for 299 metal ventilating duct systems for 40 x 100 ft grain storage bins was awarded to Great Lakes Steel Corp. by the Commodity Credit Corp.

Inclusion-free high-carbon ferro chromium

assured by new process

MOST ball and roller bearings must take terrific punishment in service, and their dependability is based directly upon the quality of steel from which they are made.

To meet the requirements of the bearing manufacturer and his customers, the steelmaker can rely upon our newly improved ferro chromium to help him produce consistently high grade bearing steels.

The high-carbon ferro chromium we have recently developed is exceptionally free from non-metallic inclusions, entrapped slag and dissolved gases. It is made by a new process* which includes filtering out harmful inclusions by pouring the metal, as tapped from the furnace, through a layer of molten slag of special composition. In addition to removing the undesirable inclusions, this process also assures greater density of the metal and the absence of shrinkage cavities in individual lumps.

High-carbon ferro chromium contains 66 to 70 per cent chromium, 4 to 6 per cent carbon, and 3 per cent maximum silicon.

Our technical staff will be glad to demonstrate to you the benefits to be gained in your steelmaking by the use of this improved high-carbon ferro chromium. *Patented

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Porcelain Products, Inc., uses a

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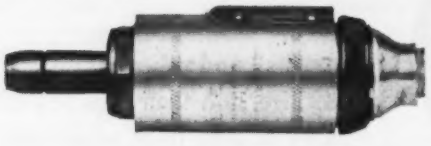

STREAM POWER AIR DRILL

• To drill clean, accurate holes in porcelain fuse boxes, Porcelain Products, Inc., Parkersburg, W. Va., selected a Buckeye portable air drill. The higher drilling speed of this powerful tool eliminated the ware break-out and chipping experienced when slower drills penetrated the inner wall of the semi-moist clay . . . in addition, the compact Buckeye air drill can be used with special jigs which increase productive output and insure absolute alignment of door hinge assembly holes, which must be drilled separately in opposite sides of each fuse box.

This manufacturer of electrical porcelain products not only solved a difficult, costly production problem with a Buckeye air tool, but made real savings in production time and costs as well. If portable air tools enter your production picture, we'd like to show you—in your own plant—what Buckeye Tools can do . . . no obligation, of course.

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A copy of the fact-filled, helpful Air Tools Catalog is yours for the asking.

AIR TOOLS:
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High Frequency ELECTRIC TOOLS:
• *Grinders* • *Buffers* • *Sanders* • *Polishers* • *Drills Screwdrivers* • *Nutrunners*

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CORPORATION
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STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

20,875 Tons, Passaic County, N. J., Passaic River bridge, New Jersey Turnpike Authority, to Bethlehem Steel Co., Bethlehem.
15,500 Tons, Hackensack, N. J., Hackensack River bridge, New Jersey Turnpike Authority, to American Bridge Co., Pittsburgh.
5700 Tons, Chicago, Veterans Administration Research Hospital, to Bethlehem Steel Co.
2325 Tons, Middlesex County, N. J., New Jersey Turnpike Authority, Contract 23, Brookfield Construction Co., New York, low bidder.
820 Tons, Nebraska, A T and T radio relay towers, to Blaw-Knox Co., Pittsburgh.
633 Tons, Hollidaysburg, Pa., admissions building for Hollidaysburg State Hospital, through McCloskey & Co., Philadelphia, to Minweld Steel Co.
483 Tons, Somerset, Pa., building No. 7, Somerset State Hospital, General State Authority, Ritter Bros., Harrisburg, low.
150 Tons, Delaware County, Pa., Pennsylvania Dept. of Highways, LR 23031, through F. A. Canuso & Sons, Philadelphia, to Bethlehem Steel Co., Bethlehem.
130 Tons, Hollidaysburg, Pa., Hollidaysburg State Hospital, building, through McCloskey & Co., Philadelphia, to Minweld Steel Co.
117 Tons, Philadelphia, sales & service building. Swenson, Inc., to William F. Lotz, Philadelphia.

Fabricated steel inquiries this week included the following:

26,000 Tons, St. Louis, Veterans' Hospital, bids due June 13.
1300 Tons, Allegheny County, Pa., Pennsylvania Turnpike Authority, Section 31b, due May 31.
1000 Tons, St. Paul, St. Anthony lock and dam.
820 Tons, Beaver County, Pa., Pennsylvania Turnpike Authority, Section 29c, due May 31.
320 Tons, Elizabeth, N. J., New Jersey Turnpike Authority, Section 25, due June 6.
231 Tons, Solano Co., Calif., bridges between Cordelia underpass and Ledgewood Creek, California Div. of Highways, Sacramento, bids to June 7.
197 Tons, Lawrence County, N. J., Pennsylvania Turnpike Authority, Section 29b, due May 31.
150 Tons, Camden-Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 27, due May 23.
123 Tons, New Haven, Conn., two span rolled beam bridge on Howard Ave., relocation of Route 1. E. T. Nettleton, New Haven, district engineer.

Reinforcing bar awards this week included the following:

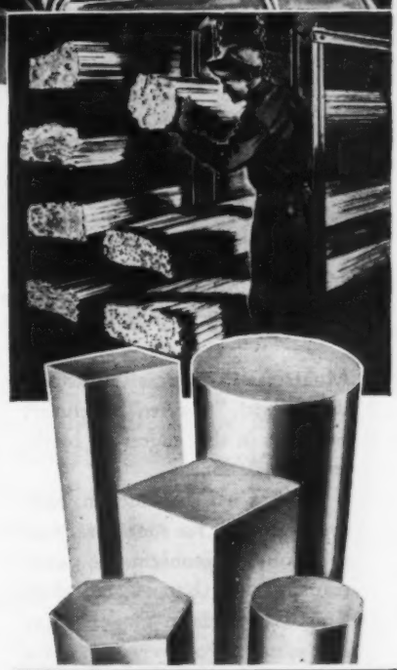
2100 Tons, Chicago, Veterans' Administration Hospital, to U. S. Steel Supply Co., Chicago.
700 Tons, Burlington County, N. J., New Jersey Turnpike Authority, Contract 28(3), bridge over Rancocas Creek, Union Building & Construction Co., Passaic, N. J., low bidder.
500 Tons, York County, Pa., Pennsylvania Dept. of Highways, LR 333(6b), through Central Pennsylvania Quarry, Stripping & Construction Co., Hazelton, Pa., to Bethlehem Steel Co., Bethlehem.
265 Tons, Freeport, Ill., high school, to McHugh Construction Co.
150 Tons, Cedar Rapids, Iowa, high school stadium thorugh Green and Gust, con-

Ask Your Steel Distributor for

J&L "E" STEEL

the NEW fast-cutting bessemer screw stock

J&L STEEL



Hundreds of machine shops report . . . Longer Tool Life . . . Better Finish . . . Faster Operation—when they use J&L "E" Steel, the amazing new bessemer screw stock for fittings . . . nuts . . . bolts . . . shafts . . . rollers and similar products.

J&L "E" Steel is available in standard shapes and in three grades: E-15, E-23 and E-33, each within the composition limits of standard bessemer screw steels with similar tensile properties.

Your steel distributor will be glad to deliver *J&L "E" Steel.* He knows that once you start using this free-cutting steel, you'll want more.

Users have obtained machinability ratings as high as 170 with J&L "E" Steel!

Your Steel Distributor is Your STEEL SERVICE CENTER for

—*QUICK DELIVERIES*

—*WELL-ASSORTED STOCKS*

—*HIGH QUALITY COLD FINISHED STEEL*

Write us for the name of the nearest steel distributor of J&L "E" and other J&L cold finished steels . . . Also let us send you our new booklet: "*Faster Machining . . . Smoother Finish . . . Longer Tool Life.*"

Any part machined from bessemer steel can be made better from "E" Steel.

"E" Steel (U. S. Pat. No. 2,484,231) is easily identified by the distinctive blue color on the end of every bar.

Jones & Laughlin Steel Corporation
403 Jones & Laughlin Building
Pittsburgh 30, Pa.

☐ Please send me the name of the nearest J&L "E" Steel distributor.

☐ Also a copy of "*Faster Machining . . . Smoother Finish . . . Longer Tool Life.*"

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JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

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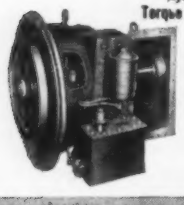
Moats...mass-produced

Moats, in 1575, were "mass-produced" with "powered" machinery as shown in this engraving by the engineer Besson.

Today's mass production, however, calls for far more practical solutions to problems of power transmission than existed when Knighthood was in Flower. More and more, the answers to modern problems are being found in hydraulic power transmission devices, with whose development the name "Twin Disc" is synonymous.

For the last 31 years, Twin Disc has been providing these solutions, not only for construction equipment, but wherever power must be applied—in the lumber, petroleum, farm equipment, marine and machine tool fields. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Hydraulic Torque Converter



TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

Hydraulic Coupling

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

tractors, to Ceco Steel Products Co., Chicago.

Reinforcing bar inquiries this week included the following:

1132 Tons, Providence, R. I., Olneyville Sq., construction of portion of the Olneyville Expressway from Hartford Ave. to Westminster St., and including viaducts over railroad, two underpass bridges, service roads, paving, etc. Charles A. Maguire and Associates, Providence, consultants. Completion date Oct. 31, 1951.

1000 Tons, Camden-Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 27, due May 23.

957 Tons, Jemez Creek, N. Mex., outlet works, Jemez Canyon Dam, Albuquerque Dist., Corps of Engineers, CIVENG-29-005-50-16, bids to June 1.

450 Tons, Chicago, Roscoe Street SW sewer.

198 Tons, Solano Co., Calif., bridges between Cordelia underpass and Ledgewood Creek, California Div. of Highways, Sacramento, bids to June 7.

175 Tons, Chicago, Halsted Street bridge, Leininger Construction Co., Chicago, low bidder.

116 Tons, Butte and Tehama Cos., Calif., bridges at Lindo Channel, Mud Creek, Keefers Slough, Rock Creek and Singer Creek, California Div. of Highways, Sacramento, bids to June 7.

April Building Hits New Mark

New York—April building and heavy engineering contract awards of $1,350,496,000 broke construction records for the second straight month, according to the F. W. Dodge Corp. The April figure was 4 pct higher than March and 60 pct higher than in April 1949.

The only drop from March was a 10 pct decrease in nonresidential projects. All building was over the April 1949 level. April residential building totaled $674,836,000, nonresidential, $448,619,000, and heavy engineering, $227,041,000.

Replaces Fire-Razed Facilities

Chicago—Year round temperature-controlled storage for customer's pattern equipment is provided in a new pattern storage building constructed by the Hansell-Elcock Co., Chicago, to replace facilities that were destroyed by a fire last year.

Equipped with overhead cranes and unit heaters, the brick and steel building provides 20,000 sq ft of floor space. Construction is tied in with a $300,000 mechanization program expected to increase the company's capacity for manufacturing heavy and medium grey iron castings.

An Ajax Forging Roll... Saves a Lot of Time and Money

No. 2 AJAX FORGING ROLLS in operation at Pittsburgh Forgings Company, Coraopolis, Pa.

The fast, simple operation of pre-rolling forging blanks in an AJAX Forging Roll greatly facilitates subsequent impression die forging. Wherever a reduced straight or tapered section is required on a blank of large cross section or where the drawing of a slender shank is required on pieces that have been previously forged, the AJAX Roll can do the work many times faster than the fastest swagers or hammers. In addition to the advantage of greatly increased forging production is the improvement in the quality. The metal is well distributed to accurately fill the die impressions, with minimum flash, and increased strength results from the improvement in grain flow. The choice of sizes in AJAX Forging Rolls and the wide adjustment feature of the Rolls makes it possible to install just the right roll to meet your needs and at the same time increase the range of your production forging equipment.

Write for Bulletin 91-A

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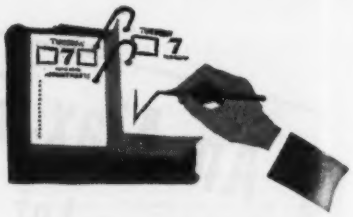
Dates to Remember



May 22-24—American Supply & Machinery Manufacturers' Assn., Industrial supply convention, Convention Hall, Atlantic City, N. J. Association headquarters are at 1108 Clark Bldg., Pittsburgh.

May 24-25—American Iron & Steel Institute, annual meeting, Waldorf-Astoria Hotel, New York. Institute headquarters are at 350 Fifth Ave., New York.

May 25-27—Society for Experimental Stress Analysis, spring meeting, Hotel Statler, Cleveland. Society post office address is Box 168, Cambridge, Mass.

May 26-27—Society for Applied Spectroscopy, annual meeting, Socony-Vacuum Training Center, New York. Society secretary is Ruth Abbott, American Cyanamid Co., Bound Brook, N. J.

May 27-30—Gas Appliance Manufacturers Assn., annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 60 E. 42nd St., New York.

June 1-2—American Society for Quality Control, national convention and midwest conference, Milwaukee Auditorium, Milwaukee. Society headquarters are at 4949 W. 65th St., Chicago.

June 1-3—Electric Metal Makers Guild, Inc., annual meeting, Shawnee Hotel, Springfield, Ohio. Guild post office address is Box 6026, Mt. Washington Station, Pittsburgh.

June 4-7—National Industrial Service Assn., Inc., annual convention, Hotel Statler, Boston. Association headquarters are at 818 Olive St., St. Louis.

June 4-9—Society of Automotive Engineers, summer meeting, French Lick Springs Hotel, French Lick, Ind. Society headquarters are at 29 W. 39th St., New York.

June 5-7—American Gear Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va. Association headquarters are in the Empire Bldg., Pittsburgh.

June 8-10—National Society of Professional Engineers, annual meeting, Hotel Statler, Boston. Society headquarters are at National Press Bldg., Washington.

June 11-14—National Purchasing Agents Assn., annual convention, Public Auditorium, Cleveland. Association headquarters are at 11 Park Place, New York.

June 12-16—American Electroplaters' Society in collaboration with the Electrodepositors' Technical Society of England, international electrodeposition conference, Statler Hotel, Boston. Society headquarters are at 473 York Road, Jenkintown, Pa.

June 19-23—American Society of Mechanical Engineers, semiannual meeting, Hotel Statler, St. Louis. Society headquarters are at 29 W. 39th St., New York.

June 22-23—Malleable Founders' Society, annual meeting, The Homestead, Hot Springs, Va. Society headquarters are in the Union Commerce Bldg., Cleveland.

June 26-30—American Society for Testing Materials, annual meeting and exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia.

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APEX

HEAVY-DUTY Sockets and Wrenches

• For real maintenance tool economy, look well beyond the original tool costs. The "savings" made on lower first costs can be quickly dissipated—many times over—through losses in maintenance time caused by quick wear-out and tool breakage.

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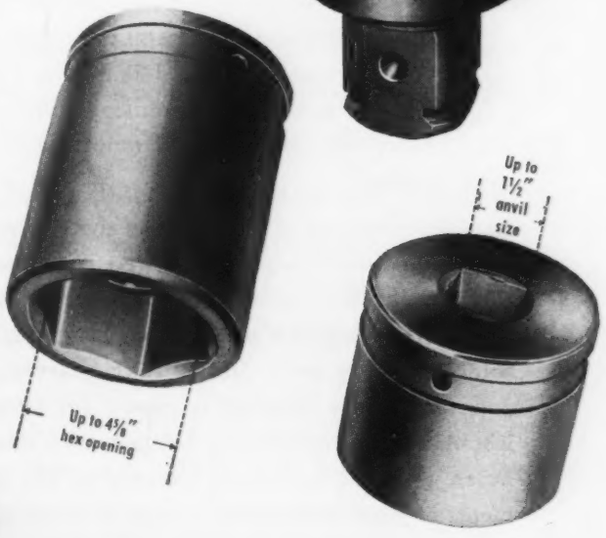
For real maintenance tool economy, fill your socket wrench requirements from the thousands of standard types and sizes available for immediate delivery from complete Apex stocks. For special applications, just send sketch or blueprint—we'll furnish quotations promptly, without obligation. Catalog 19 lists thousands of plain and universal sockets, extensions, adapters . . . write, on your company letterhead, please, for your copy.



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Exhaustive studies of each type of motor were made and leading motor repair shops were consulted. From this mass of information Johnson Bronze determined the correct alloy, the correct design and the correct tolerances for each individual bearing. Every Johnson Bronze Bearing is ready for immediate installation . . . completely finished, with flanges, oil holes, grooves, and slots, exactly to the requirements of your motors. For prompt delivery, call your local Johnson Bronze warehouse.

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British Forge Investigators Tell of U.S. Production Methods

London—When the fellow next door is able to mow his lawn better and quicker than his neighbor, it is wise and not unethical for the lagging neighbor to take a peek over the fence to see how it's done.

After a long look over the fence, a British investigating team touring drop forging plants in America with no camouflage of purpose reported to its sponsor, the National Assn. of Drop Forgers and Stampers, that the secret of American productivity is the exclusive use of forging units and teams for actual production work.

Auxiliary Teams

The investigators recommended that British drop forgers adopt the principle, accepted by both American labor and management, of maximum machine utilization. They pointed out that the hammer man is the only one who could get utmost utilization of every blow. He must not be limited by menial operations such as fetching or passing—tasks that should be relegated to a helper.

The team suggested the use of auxiliary teams when the hammer man and his crews could not maintain a back-breaking tempo of work. Enlargement of furnace facilities and hot weather ventilation to prevent work stoppage were also advised.

West Coast Freight Rates Hit

Los Angeles—Blame was heaped on taxes and "discriminatory freight rates for the west" as depressing employment at the 2-day Los Angeles County employment conference.

The automotive section indicated that intercoastal shipping would be investigated as a reply to the allegedly high rates. It was noted that the Ford assembly plant maintains a dock on Terminal Island and that an aircraft carrier transported cars of Navy personnel from the East Coast to San Diego recently.

C

You Get RELIABLE LOW-COST PERFORMANCE and UNUSUALLY LONG SERVICE LIFE from

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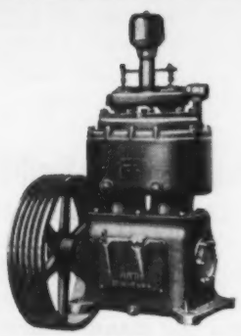
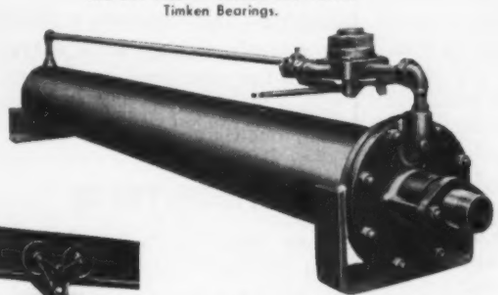
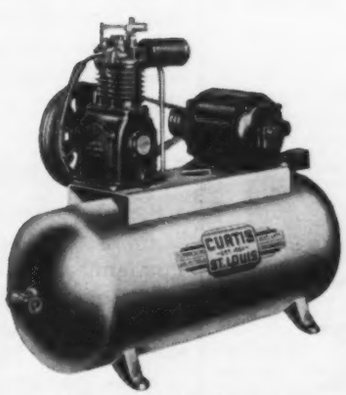


Model C Water-Cooled Compressors, up to 50 H.P. Fully Enclosed — Dust and Dirt Proof — Carbon-free Valves. Timken Bearings.



Curtis Air Cylinders For Almost Any Pushing, Pulling or Hoisting Operation.

Curtis Air Hoists Provide Accurate, Low-Cost Lifting of Material or Machines.



Curtis Model F Air Compressors are available as either electric or gasoline motor-driven units (electric motor-driven portable or stationary). Up to 10 H.P.

Industrial plants throughout the country are using Curtis Compressors, Hoists, and Cylinders to reduce production cost through manhours saved.

Curtis equipment is precision built by a company with 96 Years of Successful Manufacturing Experience—Your assurance of proper performance from the moment Curtis equipment is installed.

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• It's frequently said that, *when fire strikes,* the first 60 seconds are the most important. But, ability to capitalize those vital seconds is equally important. And such ability comes only from *advance* planning . . . and action!

Make the check now that reveals the danger spots in your operation. Match the cost of quick, adequate protection against the loss from a disastrous fire . . . or even a small fire in a key location. The time to worry about fire is *before* it strikes!

CARDOX—pioneers of low pressure carbon dioxide as an effective fire fighting medium—will welcome the opportunity to cooperate in this vital check-up. **"CARDOX" Low Pressure Carbon Dioxide Fire Extinguishing Systems*** provide many fire-fighting advantages.

Such skillfully engineered systems, in pounds or tons, provide amazingly quick, positive extinguishment.

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Write for Bulletin 255.

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• EXTINGUISHMENT
Cardox engineered applications give carbon dioxide enhanced effectiveness for faster, surer extinguishment of large or small fires, indoors or out.

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Cardox Atmosphere Inerting Systems provide low-cost inert gas for continuous fire and explosion protection

• DETECTION
Cardox Detection Systems, actuated by heat, smoke or flame, operate as a warning device or to actuate fire extinguishing systems.

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Highway Building at Peak

Washington—The dollar volume of highway construction in the 48 states this year has shoved aside the 1949 record of $1,262,506,000. It stands at $1,446,732,000 for road improvements, exclusive of maintenance, reported Lt. Gen. Eugene Reybold, executive vice-president of the American Road Builders Assn.

He said that maintenance costs were up to $452,782,000 for '50, surpassing the 1949 figure of $440,021,000. The total state highway program in 1950 will cost $1,899,514,000 as compared to the previous record high of $1,702,527,000 set in 1949.

Noll Relocates Facilities

Cleveland—The Noll Machinery Co. of this city has announced that it will move its offices and rebuilding and storage facilities into the manufacturing buildings of the old Hill-Acme property. These buildings, located at 45th and St. Clair, feature a 60,000 sq ft manufacturing area served by a 100-ton overhead crane, and are being remodeled for the coming Noll occupancy.

Aircraft Orders Pick Up

Los Angeles—Stimulated American interest in defense will result in larger appropriations for aircraft procurement, said Robert E. Gross, president of the Lockheed Aircraft Corp., recently. He reported that recent increased orders for fighter planes and antisubmarine aircraft have given a boost to southern California plants.

Firms Open Sales Offices

San Francisco—New sales offices in the Weatherly Building, Portland, Ore., have been opened by the Pacific States Steel Corp. and the American Forge Co., of Niles, Calif. Robert H. Cremere is representative for both firms, which make structural shapes, hot rolled bars and strip, grinding balls, and forgings.

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Steel or
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Whether you need machine bolts or any of the hundreds of other items in our full line of metal fastenings, the quickest, easiest, most efficient way for you to fill your requirements is to call Sterling Bolt. • It is to your advantage to use "Sterling Bolt One-Source Service" by listing *all your metal fastening needs* on one order. The benefits of One-Source Service are cumulative—convenience and efficiency in ordering, savings resulting from reduction in personnel time and paper work, and security in the knowledge that the right fastenings will be delivered to the right place at the right time. Whatever your metal fastening needs . . .

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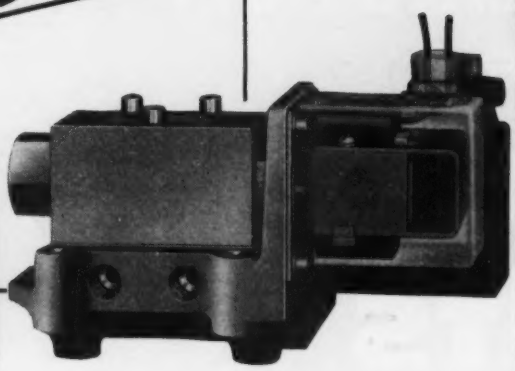
NEW INEXPENSIVE

High Cycle SOLENOID VALVES

1/8" and 1/4" sizes up to 300 cycles per minute



. . for air to 125 P. S. I.— or vacuum also low pressure hydraulic service

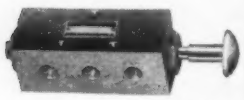
● These valves combine the utmost simplicity in design with rugged construction. They will give millions of cycles of highly satisfactory and efficient trouble-free service. Small solenoids, with short strokes work against the valve plunger, eliminating levers, links and pins. Low amperage requirement eliminates intermediate relays and simplifies electrical control circuits. Side or bottom pipe connections. Valve body and solenoid are both mounted on an aluminum base and can be removed without disturbing the piping. 2, 3, 4 and 5-way actions. ***Write for Data Sheet No. 1741.***

Individual DATA SHEETS for Each Valve —give complete details. Write today!

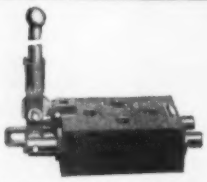
Hand Operated Air Valves—wide variety of uses. 2-way, 3-way, 4-way neutral position and compound exhaust.

Foot Operated Air Valves—workman has both hands free, speeding production. 2-way, 3-way and 4-way actions

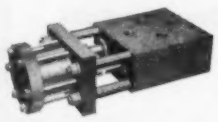
Single Plunger Valves—for air or low pressure hydraulic service. Lever, pilot, cam, diaphragm or solenoid operated. 2-way, 3-way, 4-way actions.



Series "O" and "OE" Valves—for air or hydraulic service up to 125 PSI. Push-pull, cam, pilot, diaphragm and solenoid operated. 1/8" and 1/4" pipe connections. 2-way, 3-way, 4-way and 5-way actions.



Hydraulic Valves—Up to 5000 PSI. Conservatively rated. 1/2", 3/4", 1" and 1 1/2" sizes. 2-way, 3-way, 4-way actions.



Hydraulic Valves—Up to 5000 PSI. Pilot cylinder operated. 1/2", 3/4", 1", 1 1/2" 2", 2 1/2" 3" and 4" sizes 2-way, 3-way, 4-way actions.

Quick-As-Wink Control Valves

THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

Manufactured by **C. B. HUNT & SON, Inc.**

1913 East Pershing Street, Salem, Ohio

FREE

PUBLICATIONS

Continued from Page 34

descriptions of more than a score of widely varying machine types. Many of the photos show installed-in-operation views, together with diagrammatic details; a number of operational features are shown and described. *Cincinnati Cleaning and Finishing Machinery Co.*

For free copy check No. 8 on postcard p. 35.

Precision Lapping

The Lapmaster method of flat lapping to extremely close tolerances on an automatic high production basis is fully described in a new 12-p. illustrated booklet. Among the special points of interest in the booklet are a detailed explanation of operation of the equipment, actual production results obtained by users, illustrations of many types of parts successfully lapped in production runs, as well as complete specifications for models 12 and 24 Lapmasters. *Crane Packing Co.*

For free copy check No. 9 on postcard p. 35.

Hob Sharpening

Design features, dimensions and specifications of the Barber-Colman No. 10-12 automatic hob sharpening machine for sharpening straight or helical gashed hobs and formed cutters up to 10 in. diam are presented in a new 8-p. folder. *Barber-Colman Co.*

For free copy check No. 10 on postcard p. 35.

Cutoff Machines

Pictured and described in a 4-p. bulletin are specifications and design features of four new Tabor-Brasive abrasive cutoff machines of 3 hp rating for precise cutting of bar stock and shapes. *Tabor Mfg. Co.*

For free copy check No. 11 on postcard p. 35.

Bench Micrometer

Twelve important features of the new Brown & Sharpe indicating bench micrometer, for simplifying

Turn to Page 126

TEEMING METAL
AS SEEN WITH
L&N OPTICAL PYROMETER
Note Usefulness of Big Image when smaller does not approximately fill Pyrometer field.
FURNACE ROOF
AS SEEN WITH
L&N OPTICAL PYROMETER
Smaller Image is more Useful, though either large or small can fill Pyrometer field.

Better Information About Temperature From Present L&N Optical Pyrometers

The important job of checking temperature by simply sighting an instrument on the hot object is the steel industry's task for L&N Optical Pyrometers. Because Opticals do not change accuracy when ambient temperature rises or falls, they can be kept handy to the furnace, ready for use at any time. Because they use the potentiometer principle, these portable instruments measure dependably and accurately. And, now, they are easier to use than ever before because the user can have two choices in the apparent size of his "target." All that's needed is a pyrometer tip of 4" focal length, to supplement the standard 2" tip.

With the 2" tip, the area seen by the user is 5½ inches in diameter at 5 feet; proportionately more or less at other distances. With the long tip, the field is the same size, but the image is twice as large, so that men who formerly had difficulty in getting readings now obtain them more quickly and with less effort.

Optical Pyrometers are available in Fahrenheit ranges from 1400 to 5200, or in the corresponding Centigrade ranges of 775 to 2800, or in convenient portions of each spread. Instruments can be direct-reading for the normal "black body" conditions inside a furnace, or for molten metals. All choices, as well as the extra tips, are fully described in Catalog N-33D, which also has many pictures showing equipments in use. For a copy, write Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia 44, Pa.

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REDUCES COST OF MACHINING SPINDLE GEARS BY 50%

ROTATING barbed spindles in the International Harvester cotton picker are the mechanical "fingers" which pluck cotton in modern fields.

In cutting SAE 8640 gears for these spindles on Gleason Revacycles, a dilution of Stuart's THREDKUT 99 reduced oil costs by 50%.

On the spindle broaching operation, done prior to barbing, this same Stuart product is performing with excellent results. The spindles are C1117 steel, hardness 83 on the Rockwell B scale.

On standard or special operations you will find that Stuart cutting fluids plus Stuart service are the combination that will reduce your costs. Ask for literature.

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FREE PUBLICATIONS

Continued

inspection and safeguarding the accuracy of small parts measurements, in a range of 0 to ½ in. by 0.0001 in., are listed in a new 4-p. folder. *Brown & Sharpe Mfg. Co.*

For free copy check No. 12 on postcard p. 35.

Bending Machines

Useful information on bending, examples of tube and section bends and engineering data for use in conjunction with ram or press type benders are contained in a handy 40-p. catalog describing Wallace benders. *Wallace Supplies Mfg. Co.*

For free copy check No. 13 on postcard p. 35.

Fastener Assemblies

How Eaton Springtites and Sems cut cost, save time and eliminate costly practices is described in the 40-p. Engineering Folder S-49. Complete specifications and typical applications for these screw or bolt and washer assemblies are given, along with some interesting cost comparison data between the old and new methods of fastening. A handy cost calculator will be included with the booklet upon request. *Eaton Mfg. Co.*

For free copy check No. 14 on postcard p. 35.

Inclinable Press

The new Press-Rite No. 85 open back inclinable press, exclusively featuring built-in tie rods to give greater rigidity, is described and illustrated in several new folders and catalogs. The combination of a special alloy frame plus extra heavy built-in tie rods with no sacrifice in weight means extra tons and extra large die area for large and bulky dies, as explained in the literature. *Sales Service Machine Tool Co.*

For free copy check No. 15 on postcard p. 35.

Shaft Seals

Gits low cost Roto-Flex shaft seals for positive shaft sealing in water and oil pumps, fuel oil and gasoline pumps, water circulators, compressors, speed reducers, and numerous other industrial applications, are presented in a new 8-p. bulletin. *Gits Bros. Mfg. Co.*

For free copy check No. 16 on postcard p. 35.

Resume Your Reading on Page 35

NEW

PRODUCTION IDEAS

Continued from Page 38

ball bearings, a capacitor type motor with heavy duty worm-gear drive, extra powerful vacuum unit with dual suction nozzle for pick-up of abradings, and electric counter for registering the wear cycles. Stainless steel weights plus weight of the arm provide 250, 500, and 1000-g wheel pressures against the

specimen. Various holders for different kinds of specimens have been developed and 10 kind of abrading wheels are available. Both qualitative and quantitative wear results are obtainable with the Model 140 Abraser. *Taber Instrument Corp.*

For more data check No. 31 on postcard, p. 35.

Brake-Motor

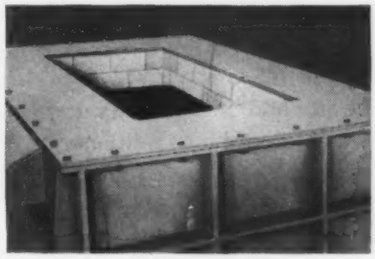
Tri-Clad motors equipped with Stearns magnetic brakes are offered as unit apparatus. All types of Tri-Clad motors up to 20 hp, 90 lb-ft static torque are available

with the explosion-proof, electrically operated brake. The compact brake-motor is said to retain all the features of the standard Tri-Clad construction and is for application on cranes, hoists, conveyers, and machine tools. For flexibility, brake combinations are selected to operate at 100 and 150 pct of full-

GALVANIZING by induction *

Seven ton capacity Ajax Low Frequency Induction Furnace now in use for Hot Dip Galvanizing.

another AJAX First



Showing the heavy refractory brick lining walls containing the molten zinc. No iron kettle is used.

Now Ajax engineers have developed a galvanizing furnace lined with an inert refractory material. The melt is internally heated by the electric induction principle introduced by Ajax more than thirty years ago. Costly iron kettle replacements and dross formation from iron kettle are eliminated. Internal circulation assures complete uniformity of temperature.

FASTER PRODUCTION • UNIFORM QUALITY LESS MAINTENANCE • LOW OPERATING COST ABSOLUTE TEMPERATURE CONTROL • LONG LIFE • REDUCED DROSSING • NO HOT SPOTS SMALLER ZINC BATH POSSIBLE

AJAX ENGINEERING CORPORATION
TRENTON 7, N. J.

AJAX TAMA-WYATT

INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

● Corrosion resistant ● Extra strength
● Shiny smooth finish ● Uniform temper

KEYSTONE'S GALVANIZED MB WIRE offers improved corrosion resistance . . . gives added life and strength to mechanical springs subject to rust and corrosive conditions.

This is due to Keystone's unique method of galvanizing the wire *before* it is cold-drawn. The drawing process smooths and hardens the galvanized finish, increasing its lasting qualities remarkably. Other advantages are its lustre-bright. shiny smooth finish . . . even, uniform temper . . . and high tensile strength.

Keystone is prepared to help solve any of your industrial wire problems. If special treatment is called for, Keystone's metallurgical research and testing facilities are available to supply the answers. We welcome your inquiry.

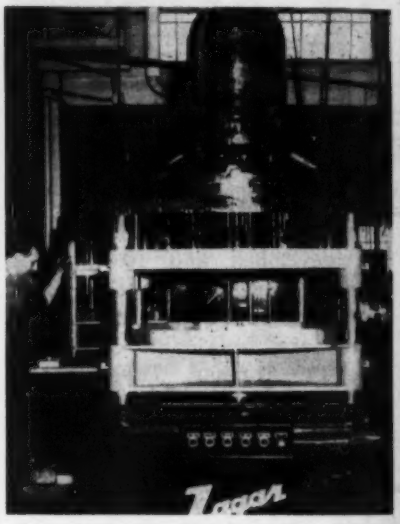
KEYSTONE
STEEL & WIRE CO.
SPECIAL ANALYSIS WIRE SETTING NEW STANDARDS OF PERFORMANCE
PEORIA ILLINOIS

load motor torque. Brake linings are fabricated of high-friction material for long life. A wear indicator, viewed through a plastic window, tells when brake linings require a simple screwdriver adjustment that compensates for wear. All brakes are totally enclosed. *General Electric Co.*

For more data check No. 32 on postcard, p. 35.

Gearless Drill Head

For drilling large diameter castings, a special drilling machine has been built with a 36-in. diam drill head and 118 spindles to drill holes from 3/16 to ⅝ in. diam, all driven without gears. Construction of the



machine consists of the gearless drill head mounted on four posts and directly driven by a 15 hp 900 rpm motor. A hydraulic ram in the machine base pushes the workpieces into the drills. After drilling is completed, the work platen lowers automatically to its original position. Cycling is controlled hydraulically with electrical switches. *Zagar Tool, Inc.*

For more data check No. 33 on postcard, p. 35.

Hydraulic Test Pump

For testing boilers, pressure vessels, pipe and piping systems, etc., the aiROYmetric pump can be set to build up any desired hydraulic process pressure up to 25,000 psi. It will maintain that pressure automatically by stroking, to take care

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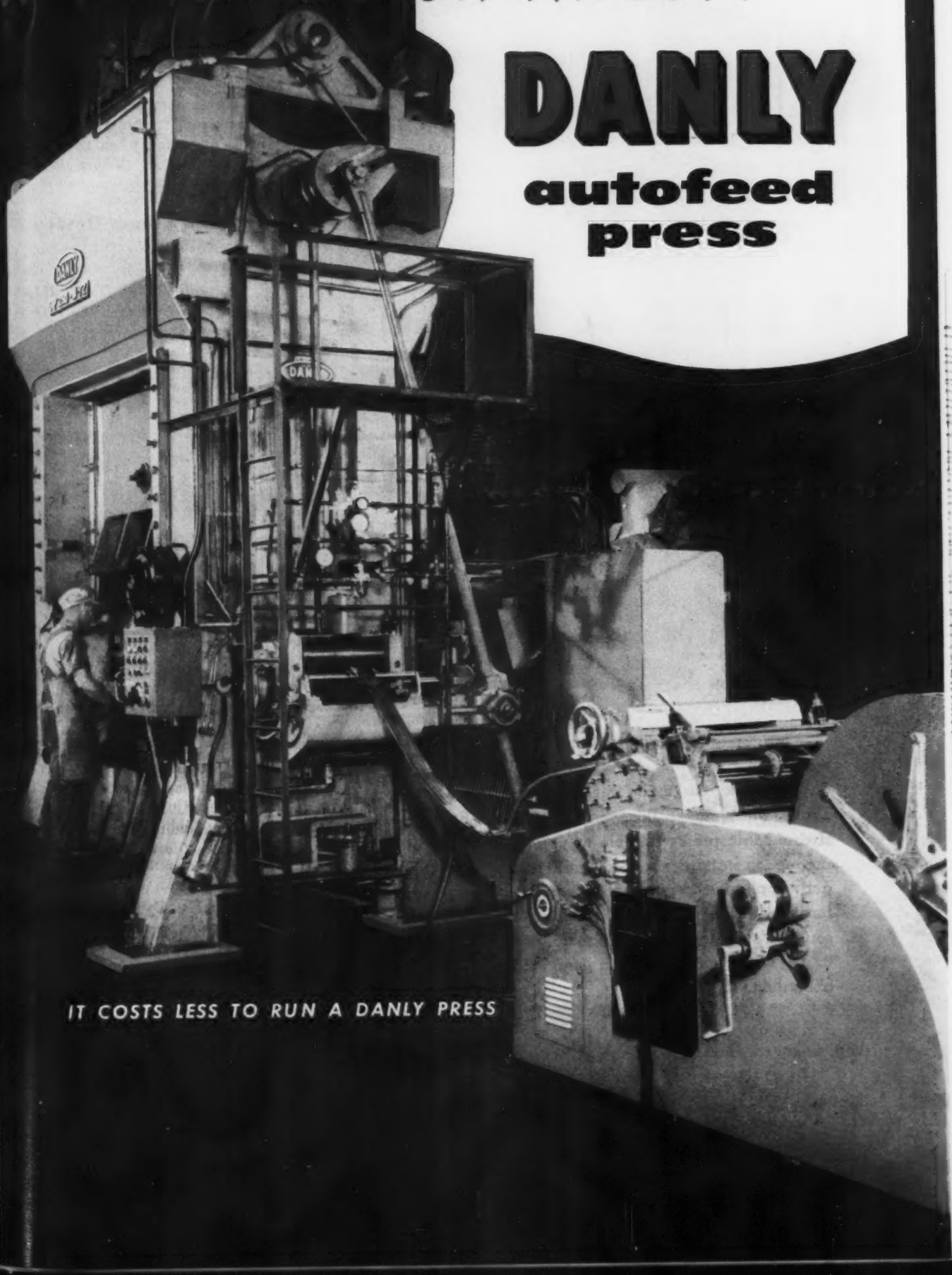
IN 4 MONTHS ON THIS...

DANLY
autofeed press



IT COSTS LESS TO RUN A DANLY PRESS

UNIVERSITY OF MICHIGAN LIBRARIES

General machine shop and maintenance work often require an *all-purpose* heavy duty open-gap forcing press adaptable to the many kinds of operations involved. That's what makes this versatile 100-ton R. D. Wood HydroLectric press valuable to *you,* from both cost and production standpoints. Moreover, it's used for machinery and appliance component assembly on a production basis, with the addition of suitable fixtures and accessories. It's made in various sizes and capacities, to strict R. D. Wood manufacturing standards. Write, without obligation, for literature.

HYDRAULIC PRESSES AND VALVES FOR [illegible] • INTENSIFIERS

EST. 1803

R. D. Wood Company

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

of any recurring pressure drop in the system. Pumps are powered by air cylinders with reciprocating pistons. Air cylinder diameters range from 2 to 14 in. with pump plunger diameters from 5/16 to 3½ in. An aiROYmetric hydrostatic test pump is a self-contained unit ready for immediate, automatic operation when the air supply is connected. *Milton Roy Co.*

For more data check No. 34 on postcard, p. 38.

Rotating Clamp Device

For fast and efficient handling of cylindrical items, a rotating clamp device is offered for use on gas and electric carloader model fork-lift trucks with 3000 to 5000-lb. ca-

pacities. Rotating and clamping are its two basic actions. Rolls may be handled in vertical or horizontal position, and changed from either position to the other. A roll can be rotated at uniform speed through 90°. Rubbed-covered, clamping arms are adjustable in three positions for handling loads of varying diameters. *Clark Equipment Co.*

For more data check No. 35 on postcard, p. 38.

Hydraulic Cylinders

Hydraulic cylinders built for push stroke applications using up to 5000 psi pressure are used in combination with Hannifin's Hy-Power generator that supplies 1000 psi pressure for approach and return strokes, then automatically multiplies pump pressure by five for the power stroke. Nine sizes range from 2 to 7¼ in. bore diam with strokes up to 6 in. Output

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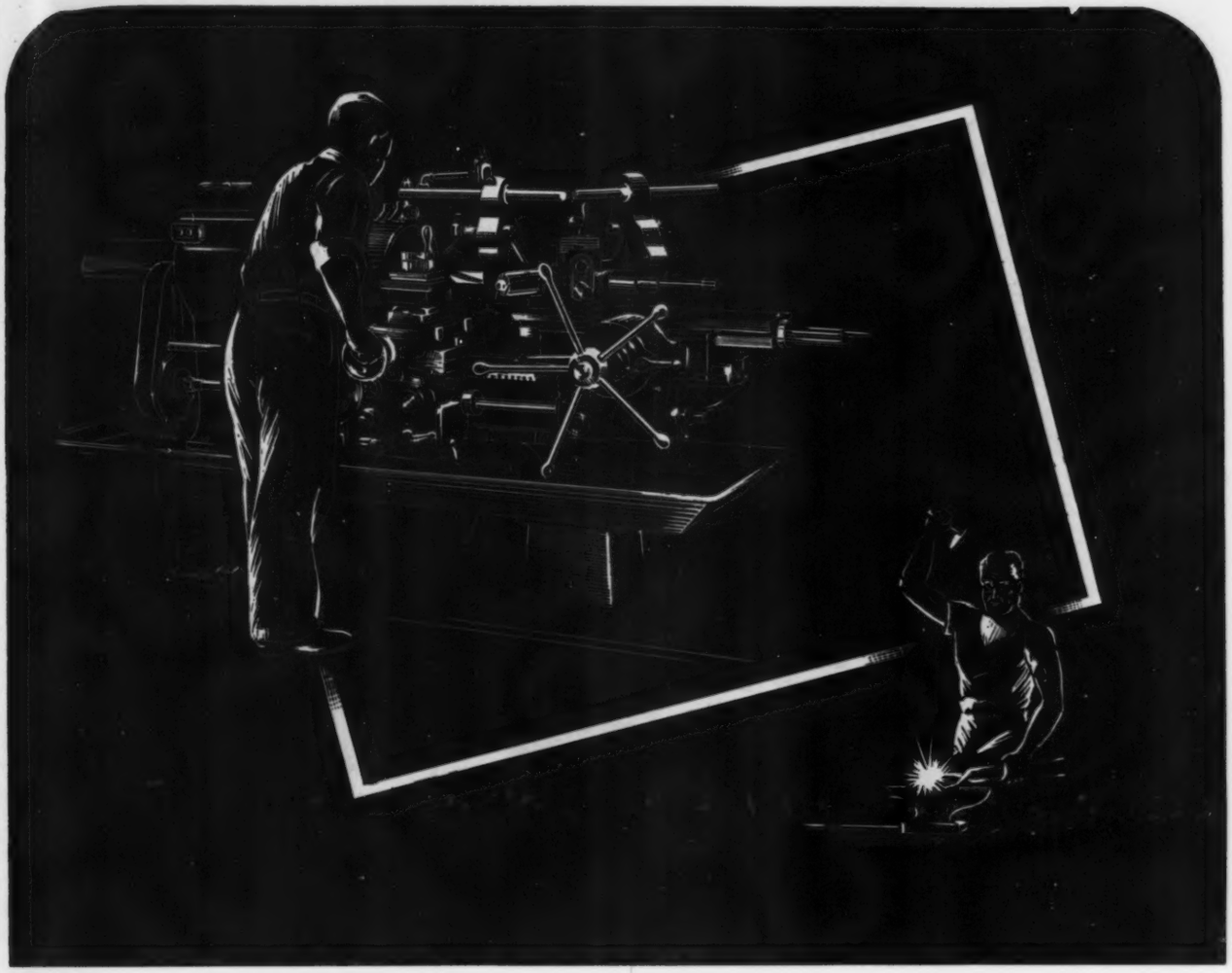


SINCE 1850

THE METAL WORKING INDUSTRY

in its advance from the crude processes of the blacksmith shop to modern precision machine tools, has been paced by the production and transportation of the ores which have made that progress possible.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

THEY* "BOOTED OUT" SALAMANDERS

THEY INSTALLED DRAVO HEATERS

THEY SAVED $4,372.00 PER YEAR

*Rosedale Foundry and Machine Company, Pittsburgh, Pa.

Like many other metalworking plants, Rosedale, producers of Meehanite Metal castings, depended for years on salamanders for heating. Everyone *assumed* that any more modern method would cost too much, and probably couldn't heat the high-roofed, metal structure much better anyway.

But no one was happy about the situation. Coke and labor were big cost items. Production was lost while men "thawed out". Air was smoky and sulphurous.

So Rosedale investigated, and found (1) that Dravo *Counterflo* Heaters could do the job for LESS cost than salamanders, (2) that Dravo was already heating many similar structures with complete satisfaction, and (3) that Dravo Heaters would help clear up the polluted atmosphere.

Result: four Dravo *Counterflo* Heaters were installed, eliminating 39 salamanders. Yearly cost-reduction is $4372. Even with 25% annual amortization, this company is currently saving $500 a year. After four years the investment will be completely written off, and the entire saving will be velvet. The indirect savings—improved production, greater employee comfort, elimination of coke fumes, and saving in floor space—are extra dividends. Everybody's happy about the heating now.

No one can afford, today, to put up with old-fashioned, inadequate heating equipment—any more than to use old-fashioned production machines. Let us review your heating problems, and provide you with some specific examples of the savings Dravo *Counterflo* Heaters are making for others—and that they can make for you. Consult your classified telephone directory for the name of the local representative—or write us direct.

DRAVO CORPORATION

DRAVO BUILDING, PITTSBURGH 22, PA.

DRAVO

Sales Representatives in Principal Cities

Mfd. and Sold in Canada by Marine Industries, Ltd., Sorel, Quebec

NEW PRODUCTION IDEAS

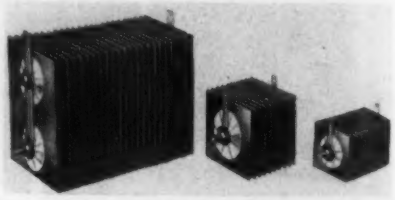
Continued

force on push applications ranges from 7½ to 100 tons with 5000 psi hydraulic pressure on the head end of piston. The Hy-Power cylinders are suitable for use where high output force is needed. Design provides for simple lock nut mounting in yoke or frame. *Hannifin Corp.*

For more data check No. 36 on postcard, p. 35.

Selenium Rectifiers

A new vacuum process produces dry selenium rectifiers of heavy duty quality in large plate sizes. High vacuum vaporization is said to deposit selenium uniformly over

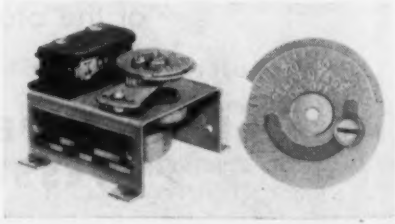


the entire plate area with absence of impurities or other flaw spots, resulting in rectifiers that withstand high inverse voltage and have low resistance in the conducting direction. Plates are processed in large sizes and sheared to desired size. Standard sizes range from 1x1 in. to 6x12 in.; special large plates are made up to 12x52 in. *Syntron Co.*

For more data check No. 37 on postcard, p. 35.

Recycling Timers

Electrical cam recycling timers, designed to repeat definite electrical on and off time cycles, are suitable for controlling innumerable



operations. Fifty different overall time cycles can be obtained from one Series CM timer, 650 in all from 11 different timers in the series. The cam is adjustable for on and off cycles ranging from 2

Turn to Page 136

Board of Strategy

What is the catcher telling the pitcher? Is it advice and counsel on an all-important pitch? In any event, he's lending all the help he can.

The Wisconsin Steel sales and metallurgical staffs are prepared to serve you, our customers, in the same way. When you need steel, we're ready to advise and assist you. And you can depend on Wisconsin for carbon and alloy steel of finest quality, delivered at the specified time.

Remember, when steel is the article, it's good business to consult Wisconsin. Our entire organization is always ready to serve you.

INTERNATIONAL HARVESTER

WISCONSIN STEEL COMPANY, Affiliate of INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue • Chicago 1, Illinois

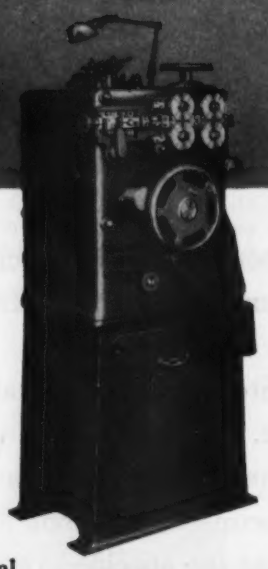
WISCONSIN STEEL

UNIVERSITY OF MICHIGAN LIBRARIES

a versatile Torrington spring coiler

does this

this...



AND a practically unlimited range of other intricate spring designs to meet exacting requirements. By all means, the professional springmaker who owns a Torrington spring coiler is the man to see for spring coiling that's accurate, speedy and economical. Our sales department will gladly help you find a source of supply for any special spring you require, or, if necessary, help your springmaker devise tooling to produce it.

This is W-11, one of fourteen versatile Torrington Spring Coilers.

SPECIFICATIONS

Wire Diameter Range: .015" to .072"

Wire Length per Spring: 0" to 42" (Extra Wire Feed Gears Available)

Coil Range (O.D.): 3/32" to 1-9/16"

Production: 23 to 190 springs per minute with variable speed drive

Torsion and other attachments available

The TORRINGTON MANUFACTURING COMPANY TORRINGTON, CONNECTICUT

NEW PRODUCTION IDEAS

Continued

to 98 pct of the total overall time cycle. *Industrial Timer Corp.*

For more data check No. 38 on postcard, p. 35.

Oil Dispensing Unit

For handling industrial oils and coolants when servicing machines with new oil or removing dirty oil from hydraulic supply tanks, a

one-man mobile dispensing unit has a fully enclosed vacuum pump and 1/3 hp motor operated by a single manual switch. A three-way valve permits prompt changeover from vacuum to pressure side of pump as needed. A pivoted platform provides easy loading and unloading of standard 55 gal oil drums. *Honan-Crane Corp.*

For more data check No. 39 on postcard, p. 35.

Truck Hoist

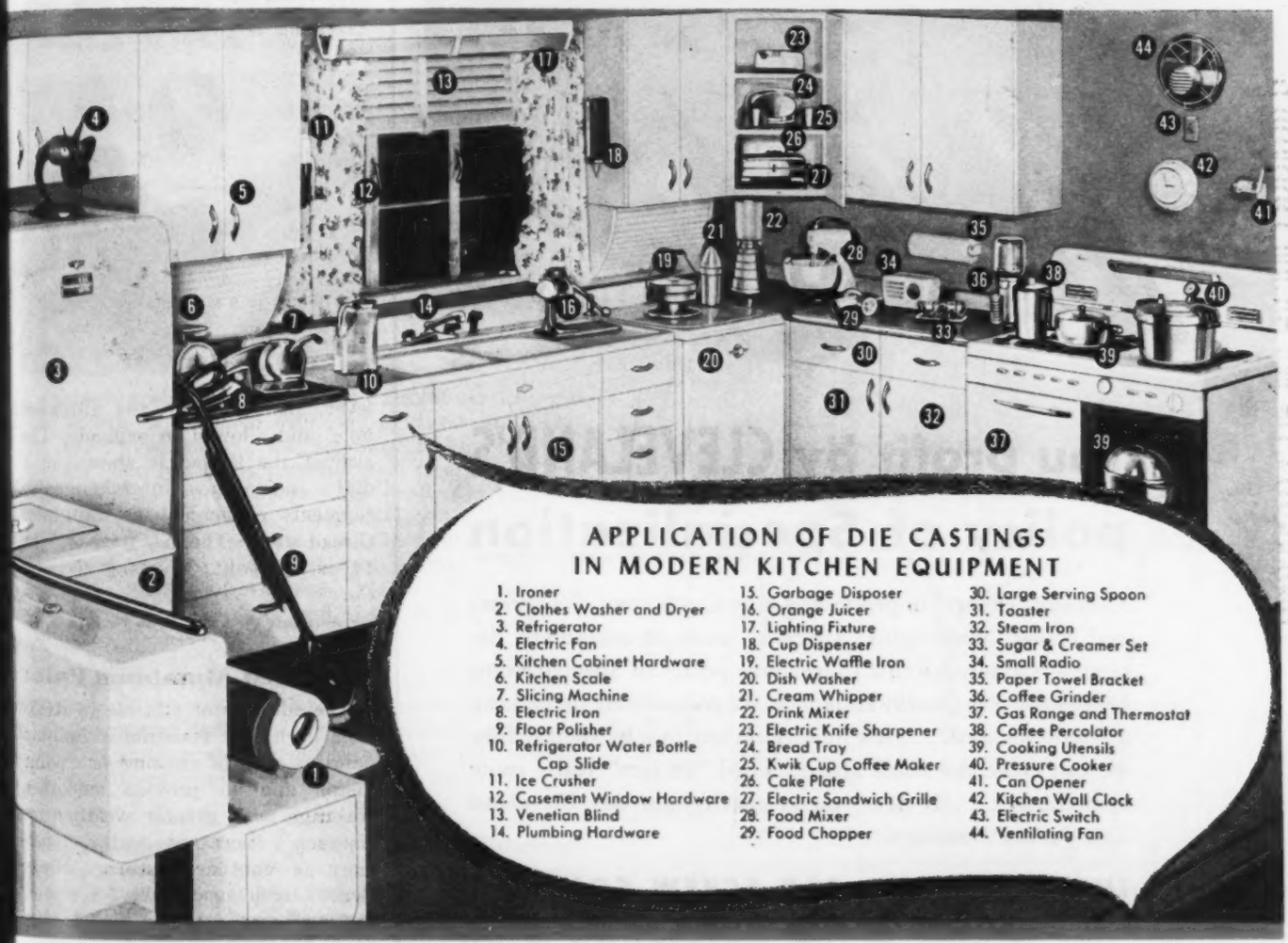
A new hydraulic underbody truck hoist can be mounted on any long-wheel base truck for loading machinery. The ramp is lowered and the machine driven on, giving

the advantages of a machinery trailer, built right on to the truck. Double acting cylinders operate the hoist in both directions, regardless of the position of the load, and handle up to 8 tons. The

Turn to Page 138

44 DIE CAST KITCHEN APPLICATIONS... AND MORE TO COME

Our Die Casting process is the shortest route between raw materials and finished product. We are anxious to assist you in your development work.



APPLICATION OF DIE CASTINGS IN MODERN KITCHEN EQUIPMENT

1. Ironer
2. Clothes Washer and Dryer
3. Refrigerator
4. Electric Fan
5. Kitchen Cabinet Hardware
6. Kitchen Scale
7. Slicing Machine
8. Electric Iron
9. Floor Polisher
10. Refrigerator Water Bottle Cap Slide
11. Ice Crusher
12. Casement Window Hardware
13. Venetian Blind
14. Plumbing Hardware
15. Garbage Disposer
16. Orange Juicer
17. Lighting Fixture
18. Cup Dispenser
19. Electric Waffle Iron
20. Dish Washer
21. Cream Whipper
22. Drink Mixer
23. Electric Knife Sharpener
24. Bread Tray
25. Kwik Cup Coffee Maker
26. Cake Plate
27. Electric Sandwich Grille
28. Food Mixer
29. Food Chopper
30. Large Serving Spoon
31. Toaster
32. Steam Iron
33. Sugar & Creamer Set
34. Small Radio
35. Paper Towel Bracket
36. Coffee Grinder
37. Gas Range and Thermostat
38. Coffee Percolator
39. Cooking Utensils
40. Pressure Cooker
41. Can Opener
42. Kitchen Wall Clock
43. Electric Switch
44. Ventilating Fan

DOEHLER-JARVIS CORPORATION

The World's Largest Producer and Finisher of Die Castings

PLANTS AT: TOLEDO, OHIO · POTTSTOWN, PA. · BATAVIA, N. Y. · GRAND RAPIDS, MICH. · CHICAGO, ILL.

EXECUTIVE OFFICES: 386 FOURTH AVENUE, NEW YORK 16, N. Y.

You profit by CLEVELAND'S policy of Specialization

Keeping "expert" in producing only Cap Screws, Set Screws and Milled Studs—plus "specials" made to customers' designs—is assurance that Cleveland's policy of Specialization brings you *Top Quality* Fasteners. We concentrate on making a *few* items *well*. . . . It's important, too, that by specializing we can make the much abused word "Service" really *mean* something. . . . It pays you to specify and buy Cleveland *Top Quality* Fasteners.

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street, Cleveland 4, Ohio
***Warehouses:* Chicago, Philadelphia, New York**

CLEVELAND *Top Quality* **FASTENERS**

ORIGINATORS OF THE KAUFMAN DOUBLE EXTRUSION PROCESS
Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners

rear end of the truck bed rests on the ground at approx a 25° incline for loading. Frames are 14 to 18 ft long, for trucks measuring 7 to 10 ft. A power winch, available as an extra, is said to make one-man operation possible in loading heavy machinery. *Henderson Mfg. Co.*

For more data check No. 40 on postcard, p. 35.

Internal Thread Gage

Used for inspection of internal threads, 5/16 to 1 in., National Coarse or National Fine, the redesigned portable internal thread gage functions as a split plug gage. The plug is collapsed by a thumb

lever, inserted into the threaded hole, and allowed to expand. The size of the thread is shown on a dial indicator. Interchangeable segments cover a wide range of thread sizes. The new gage weighs 14 oz. *Bryant Chucking Grinder Co.*

For more data check No. 41 on postcard, p. 35.

Improved Aluminum Paint

The addition of silicone to Heat-Rem high heat resistant aluminum paint is said to enhance the paint luster and to provide smoother coverage with greater weather resistance. Increased water repellence is another feature. Heat-Rem is made specifically for use on exterior and interior metal surfaces where a temperature range of 1000° to 1500°F is encountered. It fuses with the surface metal to form a bright, elastic finish resistant to moisture, corrosion, mild acids, alkalis and industrial fumes. It sets in 4 hr and dries completely over night. *Speco, Inc.*

For more data check No. 42 on postcard, p. 35.

Resume Your Reading on Page 39

Briefs and Bulletins

costly delay —Ice conditions still hamper navigation of ore carriers in the upper lakes. Delay of the shipping season this year has cost producers more than 8 million gross tons of ore, the Lake Carriers Assn. reported this week. Despite Coast Guard attempts to start the season, only 348,804 gross tons were shipped by May 1 against 8,868,286 tons shipped by May 1, 1949. March 26 was the date of the first passage at the Sault last year, but it was not until May 1 this year that the first ore cargo came through on the steamer, *Wm. G. Clude.*

in running again —For the first time since the war, the A. M. Byers Co. will resume production of wrought iron sheet sometime before June 1. Byers enters the field again to alleviate the current shortage of metal sheet. The firm will make flat and corrugated hot rolled annealed wrought iron sheet, black and galvanized, in gages from 8 to 22. Selling price will be 12c per lb for the black and 15½c for the galvanized, f.o.b. Apollo, Pa., Whitney-Apollo Steel Co., which will convert wrought iron sheet bars for Byers.

shipping slump—April domestic freight car deliveries fell to 971, as compared with 1712 in March and 10,787 in April, 1949, reports the American Railway Car Institute. This April, 223 deliveries were from car builders and 748 from railroad shops. Car production included: box, 152, hopper, 209, flat, 155, gondola, 230, refrigerator, 167, and tank, 58. April orders, all placed with car builders, stood at 3308. Order backlog as of May 1 was: car builders, 15,189; railroad shops, 17,668. This compares with 30,539 on Apr. 1, 1950 and 62,369 on May 1, 1949.

temporary visit—Some foundries have bought heavy tonnages of German cast scrap at domestic cast prices but the general feeling is that the carefully segregated and very clean scrap may not be available much longer. Germany is expected to become a scrap importer.

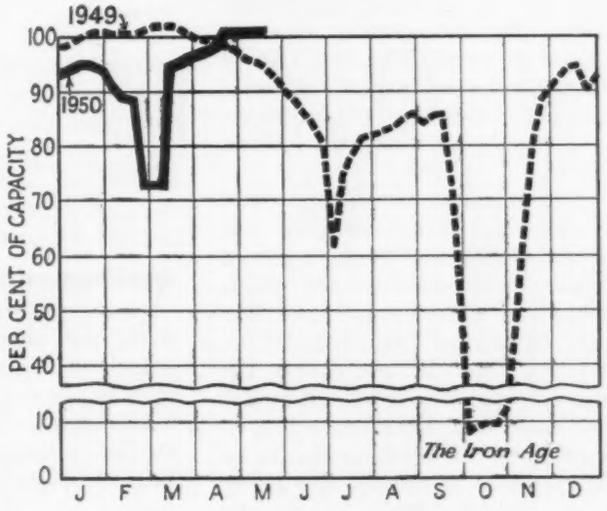
price change —The Superior Steel Corp., Carnegie, Pa., raised the price of cold rolled deoxidized copper clad strip, one side, from 19.75c to 20c per lb; both sides from 23.75c to 24.25c per lb. Hot rolled grades were increased to 16.50c per lb, one side, and to 21c both sides.

cooperage hoops — Two producers have made base price and extra changes for hot rolled tight cooperage hoops to bring the price into line with hot rolled mill edge strip. Both Carnegie-Illinois Steel Corp. and Sharon Steel Corp. reduced the base price of this product $4 per ton, from $3.60 to $3.40 per 100 lb. C-I's extra revisions represented an average increase of $9.25 per ton, while Sharon's extra changes amounted to an average boost of $14.25. However, the net prices of the two mills are now in line since Sharon's previous prices averaged $5 per ton below Carnegie's.

payroll grows —Iron and steel March employment was estimated as the highest since June, 1949, and the payrolls as the highest since April, 1949, reports the American Iron and Steel Institute. The total March payroll was $189,964,000 as compared with $174,723,000 in February and $207,152,000 in March, 1949, month of the production record. Total employment in March was 615,600 as compared with 613,400 a month ago and 651,700 a year earlier.

blown out—The No. 2 blast furnace of the National Works of the National Tube Co. was blown out for relining on May 4.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 7	101.5	104.0	92.5*	86.0	96.0	104.0	105.0	106.0	101.0	100.5	87.5	82.0	91.5	100.5
May 14	101.0	104.0	93.0	86.0	95.0	104.0	106.0	106.0	102.0	101.5	88.5	87.0	106.5	100.5

* Revised.

Nonferrous Metals OUTLOOK

Market Activities

Zinc and copper demand continues heavy . . . Rise in lead to 12¢ lessens buying . . . Domestic copper deliveries down . . . World figures in better balance

by John Anthony

New York—Buying interest in zinc and copper continued very heavy last week and early this week. Demand for lead was at a somewhat reduced level, ever since the ½¢ rise last Thursday. But the ½¢ advance in zinc has been absorbed readily by sustained demand. The new rise in the copper market had not materialized early this week, although most observers were still looking for it.

The rapidly advancing lead market has been bringing out scrap in tonnage. Traders do not expect additional upward movements, as heavier tonnages are now being made available to the market. The smelting charge for battery lead has remained at $40 for some time, but there is talk of increasing the smelting charge by $10 a ton to discourage the heavy scrap intake. There is also the advantage to smelters in buying foreign pig lead being offered at prices only slightly higher than scrap.

Demand for practically all grades of zinc is very heavy. Galvanizers, die casters and brass mills are buying heavily. And there is the additional drain of stockpiling requirements. In the second quarter, trade factors report that the objective of 30,000 tons was missed by more than 10,000 tons. There is no information on the objective for the last half of the year.

NONFERROUS METALS PRICES

	May 10	May 11	May 12	May 13	May 15	May 16
Copper, electro, Conn.	19.50	19.50	19.50	19.50	19.50	19.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	77.50	77.625	77.625	....	77.00	*77.875
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	11.30	11.80	11.80	11.80	11.80	11.80

Note: Quotations are going prices.
* Tentative.

June Copper Not Covered

In the copper market it is evident that some buyers are not fully covered for June, particularly in the case of special shapes. Scrap copper is very tight, even though refineries advanced their buying prices more than a week ago.

The domestic copper picture revealed by the April statistics of the Copper Institute are very significant. Refined stocks at the end of the month have been pushed down by another 3000 tons, to 57,028 tons. Deliveries to customers were down by more than 21,000 tons from the March peak. But this was due to the shortage, rather than to any lessened buying interest. Deliveries to customers in April were 101,729 tons. Production of crude copper in April was down by more than 4000 tons, to 74,262 tons.

The world copper picture, including the United States, shows a much better balance. Deliveries to fabricators in April were 173,776 tons, down 22,000 tons from the previous month. Crude copper production was 178,818 tons in the month, down 9000 tons, due in part to the Chile copper strike. Refined production was 192,662 tons. These figures indicate that the solution to the domestic shortage might be importation of more South American copper.

The tin market was all but the same as last week. Tin buying is active in small lots from spot to September.

MILL PRODUCTS

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in., and heavier: 2S, 3S, F, 23.8¢ 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4; ⅜ to 11/32 in., 49¢ to 38¢; ⅝ to 1½ in., 37.5¢ to 35.5¢; 1 9/16 to 3 in., 35.5¢ to 32.5¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T-6, 76¢ to 55¢.

Extruded Tubing, Rounds: 63S-T5; OD in in.: 1¼ to 2, 33¢ to 48.5¢; 2 to 4, 30¢ to 40.8¢; 4 to 6, 30.5¢ to 37.3¢; 6 to 9, 31¢ to 39.8¢.

Roofing Sheet, Flat: 0.019 in. x 28 in, per sheet, 72 in., $1.045; 96 in., $1.393; 120 in., $1.742; 144 in., $2.090. Gage 0.024 in. x 28 in., 72 in., $1.271; 96 in., $1.695; 120 in., $2.116; 144 in., $2.540.

Coiled Sheet: 0.019 in. x 28 in., 25.7¢ per lb; 0.024 in. x 28 in., 24.7¢ per lb.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ⅝, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher. Base: Up to ¾ in. diam., 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	33.18		32.78
Copper, h-r		29.03	
Copper, drawn		30.28	
Low brass	31.07	30.76	
Yellow brass	29.61	29.30	
Red brass	31.56	31.25	
Naval brass	34.26	28.32	29.58
Leaded brass		23.99	28.02
Com'l bronze	32.58	32.27	
Manganese bronze	37.76	31.66	33.22
Phosphor bronze	50.90	51.15	
Muntz metal	32.48	28.04	29.29
Everdur, Herculoy, Olympic, etc.	37.93	36.87	
Nickel silver 10 pct	40.51	42.69	47.46
Arch. bronze			28.02

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	24.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$56.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	19.50
Copper, lake, Conn. Valley	19.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	11.80
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	20.50
Magnesium, sticks, 100 to 500 lb	36¢ to 38¢
Mercury, dollars per 76-lb flask f.o.b. New York	$70 to $73
Nickel, electro, f.o.b. New York	42.97
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	36.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$66 to $69
Silver, New York, cents per oz	72.75
Tin, New York	77.875
Zinc, East St. Louis	12.00
Zinc, New York	12.72
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	18.25-18.75
No. 120	17.75-18.25
No. 123	17.25-17.75
80-10-10 ingot	
No. 305	22.25
No. 315	20.25
88-10-2 ingot	
No. 210	28.25
No. 215	25.75
No. 245	19.75-21.50
Yellow ingot	
No. 405	15.50-16.50
Manganese bronze	
No. 421	21.25

Aluminum Ingot

(Cents per lb, of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.50-19.00
0.60 copper, max.	18.25-18.75
Piston alloys (No. 122 type)	17.00-17.50
No. 12 alum. (No. 2 grade)	16.50-17.00
108 alloy	16.75-17.25
195 alloy	17.75-18.25
13 alloy	18.50-19.00
AXS-679	17.00-17.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	17.50-18.00
Grade 2—92-95%	16.50-17.00
Grade 3—90-92%	15.50-16.00
Grade 4—85-90%	15.00-15.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	36⅛
Electrodeposited	30¾
Rolled, oval, straight, delivered	34.34
Forged ball anodes	35
Brass, 80-20	
Cast, oval, 15 in. or longer	31¾
Zinc, oval, 99.886, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	49¼
Copper sulfate, 99.5 crystals, bbl.	10¾
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz lots, per oz	61¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, 89 pct granular	7.15
Zinc cyanide, 100 lb drums	41¼

SCRAP METALS

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	16½	15¾
Yellow brass	13⅜	12⅛
Red brass	15	14¼
Commercial bronze	15¼	14½
Manganese bronze	12¾	11⅞
Leaded brass rod ends	13	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	16.25
No. 2 copper wire	15.25
Light copper	14.25
Refinery brass	15.25*
Radiators	11.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	16.25
No. 2 copper wire	15.25
Light copper	14.25
No. 1 composition	14.00
No. 1 comp turnings	13.50
Rolled brass	11.75
Brass pipe	12.75
Radiators	11.00
Heavy yellow brass	10.75
Aluminum	
Mixed old cast	9.75-10.00
Mixed old clips	10.75-11.00
Mixed turnings, dry	9.50- 9.75
Pots and pans	9.75-10.00
Low copper	11.50-11.75

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	15 —15¼
No. 2 heavy copper and wire	14 —14¼
Light copper	13 —13¼
Auto radiators (unsweated)	9¾—10
No. 1 composition	12¼—12½
No. 1 composition turnings	11¾—12
Clean red car boxes	10¾—11
Cocks and faucets	10¾—11
Mixed heavy yellow brass	8½— 8¾
Old rolled brass	10 —10¼
Brass pipe	11 —11¼
New soft brass clippings	11¾—12¼
Brass rod ends	10¾—11
No. 1 brass rod turnings	10½—10¾

Aluminum

Alum. pistons and struts	5 — 5½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½—11
Old sheet and utensils	7½— 8
Borings and turnings	4½
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	8¼— 8½
Old zinc	6 — 6½
Zinc routings	4 — 4½
Old die cast scrap	4½— 4¾

Nickel and Monel

Pure nickel clippings	24 —25
Clean nickel turnings	16 —17
Nickel anodes	23 —24
Nickel rod ends	23 —24
New Monel clippings	14 —15
Clean Monel turnings	8 — 9
Old sheet Monel	11½—12½
Old Monel castings	9 —10
Inconel clippings	12 —13
Nickel silver clippings, mixed	9 —10
Nickel silver turnings, mixed	6 — 7

Lead

Soft scrap, lead	9¼— 9½
Battery plates (dry)	5 — 5¼

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	60 —62
No. 1 pewter	38 —40
No. 1 auto babbitt	35 —37
Mixed common babbitt	9 — 9¼
Solder joints	12 —12½
Siphon tops	40 —42
Small foundry type	13 —13½
Monotype	11½—12
Lino. and stereotype	11 —11½
Electrotype	9¼— 9½
New type shell cuttings	13 —13¼
Hand picked type shells	6½— 7
Lino. and stereo. dross	4¼— 4¾
Electro. dross	2¾— 3

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Steelmaking Grades Continue to Advance

Prices for steelmaking scrap were higher this week in most districts. Railroad lists have been showing unusual strength and in almost all cases have been further ahead of No. 1 steel than they usually are.

Brokers in many areas are covering short orders at a loss, figuring that the next order is bound to be higher. Dealers in some spots will not sell freely, sharing the same bullish ideas. Mills are doing their utmost to show a lack of interest and to hold prices down by staying out of the market wherever possible.

Steel foundry items were particularly active. Bidding on these grades on railroad lists is not much different than it was in 1948. Prices are at levels few thought would be reached this year.

PITTSBURGH—No. 1 heavy melting steel advanced $1 to $37, top. Brokers were paying $36.50 to cover an old order. There were reports of sales at $37.50 and $39. The market continued strong. No. 2 bundles jumped $1.50 to a top of $30. Machine shop turnings and short turnings were up 50¢. Low phos advanced $1.50. Prices paid for the latest railroad list were $1.50 higher. The cast market was stronger.

CHICAGO—Mills in the area are trying to hold scrap prices down with little success. Remote scrap is coming into the market at above Chicago prices and the railroads are selling at top dollar. Private deals are increasing. Dealers still won't sell freely and in some cases brokers are covering shorts at well over the last mill price. Foundry items are still hot. Nobody is sure where the market will firm. At press time brokers were reported offering $33 per gross ton for No. 1 heavy melting steel and $31 per gross ton for No. 2 heavy melting.

PHILADELPHIA — The market was strong at the increased prices of a week ago, but there were no further advances in steel grades. Brokers are paying up to the limit to cover. The pressure is on to get shipments out. Low phos grades were up last week, although most consumers are comfortably fixed. Punchings and plate was up $1; 5 ft and under was up $1.50 to $2. Rail specialties and malleable were up $1. The local market has advanced under the pressure of Pittsburgh prices. But so far there is no indication of softening due to embargoed shipments to the West before the strike ended.

NEW YORK—No. 1 steel was up another $1.50 a ton this week. No. 2 grades and shoveling turnings advanced by 50¢. Though shipments to a number of mills in the East and in Pittsburgh were unaffected by the railroad strike, the cutoffs quieted some speculative fever. Most brokers still felt that the next orders would have to be at higher prices. Cast is quiet and prices are unchanged.

DETROIT—Scrap prices here show no signs of weakness despite handicaps imposed by the partial railroad strike that hit both scrap buyers and scrap sellers located on sidings of struck railroads. While market activity here was quieter than it would be if free rail movement was possible, underlying pressures are still very strong. The present outlook is that scrap lists scheduled within the next two weeks will continue to reflect the strong position of the market.

CLEVELAND—After an appraisal of all factors, including broker buying, No. 1 heavy melting steel is quotable at $36.50 to $37 in the Valley this week. Demand for all grades except No. 2 bundles is very strong. Tonnage was backing up at plants and dealers' yards as a result of the railroad strike, which according to various estimates had reduced movement of scrap in this district 40 to 50 pct. Mills are owed scrap but are forced to use inventory as a result. This is probably one of the hardest markets for a consumer to buy in since the end of World War II.

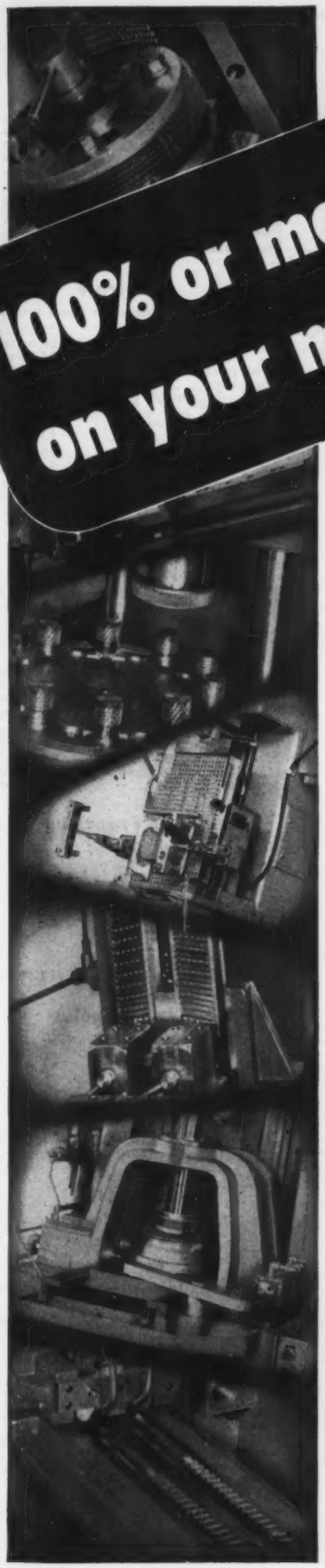
ST. LOUIS—In endeavoring to cover their short interest, dealers' prices of melting grades of scrap iron in the St. Louis industrial district have been increased, although consumers' prices are unchanged. Dealers say there is a shortage of material and they must compete with outside markets for the available supplies. Foundry grades are higher on buying by the consumers as well as demand from outside markets.

CINCINNATI—Dealers are selling but not unloading in an active scrap market here. Prices are unchanged from last week and tonnage is being traded at quoted prices despite the bullish effect of the railroad strike which curtailed but did not drastically reduce movement of tonnage in this district. Demand for open-hearth grades and blast furnace scrap is very strong and demand for foundry material is fair.

BOSTON—No. 1 steel remains unchanged this week since the national market has caught up with the local condition that sent the price of No. 1 up substantially a few weeks ago. However, No. 2 steel was up $1 and No. 2 bundles were 50¢ a ton higher. Mixed borings and turnings were up $1, No. 1 busheling was $2 higher. The rail strike has left a bad car shortage here.

BIRMINGHAM—The market is bullish here with price increases occurring throughout the list. Blast furnace material and specialties are in particularly heavy demand. Mills are attempting to buy considerable tonnages of openhearth grades but scrap owners, anticipating a further price advance, are not anxious to sell.

BUFFALO—Prices on No. 1 heavy melting steel advanced $2 a ton to $31.50-$33 but the general level of the market continues far out of line with markets elsewhere. Large quantities of scrap from outlying districts, which usually move here, are being channeled into other markets where higher prices are quoted.



100% or more per year on your money . . . .

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You can't beat that kind of an investment.

PIONEERS OF H.S.S. BROACHING

COLONIAL

BROACH CO. DETROIT 13

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$36.50 to $37.00
No. 2 hvy melting	32.50 to 33.00
No. 1 bundles	36.50 to 37.00
No. 2 bundles	29.50 to 30.00
Machine shop turn.	26.00 to 26.50
Mixed bor. and ms. turns.	26.00 to 26.50
Shoveling turnings	28.50 to 29.00
Cast iron borings	27.50 to 28.00
Low phos. plate	39.50 to 40.00
Heavy turnings	35.00 to 36.00
No. 1 RR. hvy. melting	40.00 to 40.50
Scrap rails, random lgth.	41.00 to 41.50
Rails 2 ft and under	43.50 to 44.00
RR. steel wheels	41.00 to 41.50
RR. spring steel	41.00 to 41.50
RR. couplers and knuckles	41.00 to 41.50
No. 1 machinery cast	41.50 to 42.50
Mixed yard cast.	36.50 to 37.00
Heavy breakable cast.	34.00 to 35.00
Malleable	38.00 to 39.00

Chicago

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 factory bundles	32.00 to 33.00
No. 1 dealers' bundles	28.00 to 29.00
No. 2 dealers' bundles	25.00 to 26.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Low phos. forge crops	36.00 to 37.00
Low phos. plate	35.00 to 36.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	50.00 to 51.00
Rails 2 ft and under	47.00 to 48.00
Locomotive tires, cut	44.00 to 45.00
Cut bolsters & side frames	40.00 to 41.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	52.00 to 53.00
RR. couples and knuckles	41.00 to 42.00
No. 1 machinery cast.	45.00 to 46.00
No. 1 agricul. cast.	41.00 to 42.00
Heavy breakable cast.	35.00 to 36.00
RR. grate bars	35.00 to 36.00
Cast iron brake shoes	35.00 to 36.00
Cast iron car wheels	38.00 to 39.00
Malleable	44.00 to 45.00

Philadelphia

No. 1 hvy. melting	$27.50 to $28.50
No. 2 hvy. melting	25.50 to 26.50
No. 1 bundles	27.50 to 28.50
No. 2 bundles	22.00 to 23.00
Machine shop turn.	19.00 to 19.50
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	20.00 to 21.00
Low phos. punchings, plate	31.00 to 32.00
Low phos. 5 ft and under	31.00 to 31.50
Low phos. bundles	27.50 to 28.50
Hvy. axle forge turn.	27.50 to 28.50
Clean cast chem. borings	29.00 to 30.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
Rails 18 in. and under	41.00 to 42.00
No. 1 machinery cast	37.00 to 38.00
Mixed yard cast	33.00 to 34.00
Heavy breakable cast	35.00 to 36.00
Cast iron carwheels	39.00 to 40.00
Malleable	41.00 to 42.00

Cleveland

No. 1 hvy. melting	$33.00 to $33.50
No. 2 hvy melting	30.00 to 30.50
No. 1 busheling	33.00 to 33.50
No. 1 bundles	33.00 to 33.50
No. 2 bundles	25.50 to 26.00
Machine shop turn.	21.50 to 22.00
Mixed bor. and turn.	24.50 to 25.00
Shoveling turnings	24.50 to 25.00
Cast iron borings	24.50 to 25.00
Low phos. 2 ft and under	33.00 to 33.50
Steel axle turn.	31.00 to 31.50
Drop forge flashings	33.00 to 33.50
No. 1 RR. hvy. melting	38.00 to 38.50
Rails 3 ft and under	44.00 to 44.50
Rails 18 in. and under	44.50 to 45.50
No. 1 machinery cast.	44.50 to 45.00
RR. cast	44.50 to 45.00
RR. grate bars	32.00 to 33.00
Stove plate	36.00 to 37.00
Malleable	42.00 to 43.00

Youngstown

No. 1 hvy. melting	$36.50 to $37.00
No. 2 hvy. melting	33.50 to 34.00
No. 1 bundles	36.50 to 37.00
No. 2 bundles	$29.50 to $30.00
Machine shop turn.	24.00 to 24.50
Shoveling turnings	27.00 to 27.50
Cast iron borings	27.00 to 27.50
Low phos. plate	37.50 to 38.00

Buffalo

No. 1 hvy. melting	$31.50 to $32.00
No. 2 hvy. melting	29.50 to 30.00
No. 1 busheling	29.50 to 30.00
No. 1 bundles	30.50 to 31.00
No. 2 bundles	28.50 to 29.00
Machine shop turn.	23.00 to 23.50
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	26.00 to 26.50
Cast iron borings	25.50 to 26.00
Low phos. plate	32.50 to 33.00
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	38.50 to 39.00
RR. steel wheels	33.50 to 36.00
RR. spring steel	33.50 to 36.00
RR. couplers and knuckles	33.50 to 36.00
No. 1 machinery cast.	38.00 to 38.50
No. 1 cupola cast.	36.00 to 36.50
Stove plate	34.00 to 34.50
Small indus. malleable	30.00 to 30.50

Birmingham

No. 1 hvy. melting	$27.50 to $28.50
No. 2 hvy. melting	25.50 to 26.00
No. 2 bundles	23.50 to 24.00
No. 1 busheling	27.50 to 28.50
Machine shop turn.	22.00 to 22.50
Shoveling turnings	23.50 to 24.00
Cast iron borings	20.00 to 20.50
Bar crops and plate	32.50 to 33.00
Structural and plate	32.50 to 33.00
No. 1 RR. hvy. melt.	31.00 to 31.50
Scrap rails, random lgth.	35.50 to 36.00
Rerolling rails	41.50 to 42.00
Rails 2 ft and under	37.50 to 38.00
Angles & splice bars	37.00 to 38.00
Std. steel axles	32.00 to 33.00
No. 1 cupola cast	35.00 to 36.00
Stove plate	30.50 to 31.50
Cast iron carwheels	30.00 to 31.00

St. Louis

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 bundled sheets	27.00 to 28.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.00
Rails, random lengths	36.00 to 38.00
Rails 3 ft and under	41.00 to 43.00
Locomotive tires, uncut	34.00 to 36.00
Angles and splice bars	39.00 to 40.00
Std. steel car axles	46.00 to 48.00
RR. spring steel	39.00 to 40.00
No. 1 machinery cast.	39.00 to 41.00
Hvy. breakable cast.	33.00 to 35.00
Cast iron brake shoes	33.00 to 35.00
Stove plate	33.00 to 34.00
Cast iron car wheels	38.00 to 39.00
Malleable	35.00 to 36.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $27.50
No. 2 hvy. melting	22.00 to 22.50
No. 2 bundles	20.50 to 21.00
Machine shop turn.	15.50 to 16.00
Mixed bor. and turn.	15.50 to 16.00
Shoveling turnings	17.50 to 18.00
Clean cast chem. bor.	23.00 to 24.00
No. 1 machinery cast.	30.00 to 30.50
Mixed yard cast.	28.00 to 28.50
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstrp. motor blocks	21.00 to 21.50

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.00 to $25.50
No. 2 hvy. melting	21.00 to 21.50
No. 1 bundles	25.00 to 25.50
No. 2 bundles	$19.50 to $20.00
Machine shop turn.	15.00 to 15.50
Mixed bor. and turn.	15.00 to 15.50
Shoveling turnings	16.50 to 17.50
No. 1 busheling	24.00 to 24.50
Clean cast chem. borings	19.50 to 20.00
No. 1 machinery cast.	30.00 to 31.00
No. 2 machinery cast.	26.50 to 27.00
Heavy breakable cast.	25.50 to 26.50
Stove plate	26.00 to 27.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	26.00 to 26.50
No. 1 bundles	34.50 to 35.00
New busheling	33.00 to 33.50
Flashings	29.50 to 30.00
Machine shop turn.	19.50 to 20.00
Mixed bor. and turn.	19.50 to 20.00
Shoveling turnings	22.50 to 23.00
Cast iron borings	22.50 to 23.00
Low phos. plate	33.00 to 33.50
No. 1 cupola cast.	39.00 to 40.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	34.00 to 35.00
Automotive cast.	42.00 to 43.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$31.50 to $32.00
No. 2 hvy. melting	26.50 to 27.00
No. 1 bundles	31.50 to 32.00
No. 2 bundles, black	25.50 to 26.00
No. 2 bundles, mixed	22.50 to 23.00
Machine shop turn.	17.50 to 18.00
Mixed bor. and turn.	19.50 to 20.00
Shoveling turnings	20.50 to 21.00
Cast iron borings	20.50 to 21.00
Low phos. 18 in. under	37.50 to 38.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.50 to 48.50
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	36.50 to 37.50
Drop broken cast.	45.50 to 46.50

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn.	9.00
Elec. fur. 1 ft and under	28.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast.	$30.00 to 33.50

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	5.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$35.50 to 38.00

Seattle

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	$29.00 to 30.00
RR. hvy. melting	19.00
No. 1 cupola cast.	30.00 to 35.00
Heavy breakable cast.	20.00

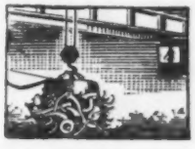
Hamilton, Ont.

No. 1 hvy. melting	$27.00
No. 1 bundles	19.00
No. 2 bundles	19.00
Mechanical bundles	25.00
Mixed steel scrap	23.00
Mixed bor. and turn.	20.00
Rails, remelting	27.00
Rails, rerolling	30.00
Bushelings	21.50
Bush., new fact, prep'd.	25.00
Bush., new fact, unprep'd.	20.00
Short steel turnings	20.00
Cast scrap	40.00

For the Purchase or Sale of

Iron and Steel Scrap . . .

CONSULT OUR NEAREST OFFICE



Since 1889 Luria Brothers and Company, Incorporated, have maintained their leadership in the industry by keeping abreast of the most modern methods . . . by seeking out the best markets in every part of the world . . . by strategically locating their offices to best serve the interests of their customers.

LURIA BROTHERS & COMPANY, INCORPORATED

LINCOLN-LIBERTY BUILDING
PHILADELPHIA 7, PENNSYLVANIA

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BIRMINGHAM, ALA. 418 Empire Bldg.	**CHICAGO, ILL.** 100 W. Monroe St.	**HOUSTON, TEXAS** 803-4-5 Milam Bldg.	**PITTSBURGH, PA.** Oliver Bldg.
BOSTON, MASS. Statler Bldg.	**CLEVELAND, O.** 1022 Midland Bldg.	**LEBANON, PA.** Luria Bldg.	**PUEBLO, COLO.** 334 Colorado Bldg.
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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	May 16, 1950	May 9, 1950	Apr. 18, 1950	May 17, 1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plates	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.50	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.15
Rails: dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	May 16, 1950	May 9, 1950	Apr. 18, 1950	May 17, 1949
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$50.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	49.08	49.08	49.08	45.47
No. 2, Birmingham	42.38	42.38	42.38	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	49.74
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$36.75	$35.75	$32.75	$22.75
Heavy melt'g steel, Phila.	28.00	28.00	25.50	22.00
Heavy melt'g steel, Ch'go	32.50	32.50	28.50	23.50
No. 1 hy. com. sh't, Det.	34.75	34.25	29.25	16.75
Low phos. Young'n	37.75	36.75	34.75	24.75
No. 1, cast, Pittsburgh	42.00	41.50	39.50	27.75
No. 1, cast, Philadelphia	37.50	37.50	37.50	28.00
No. 1, cast, Chicago	45.50	45.50	41.50	28.00
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.25
Foundry coke, prompt	16.25	16.25	16.25	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	19.50	19.50	18.50	18.00
Copper, Lake Conn.	19.625	19.625	18.625	18.625
Tin Straits, New York	77.875†	77.125	76.50	$1.03
Zinc, East St. Louis	12.00	12.00	10.50	12.00
Lead, St. Louis	11.80	11.05	10.30	13.85
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.93
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	24.50	24.50	24.50	38.50

† Tentative.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
May 16, 1950	3.837¢ per lb.	$46.38 per gross ton	$32.42 per gross ton
One week ago	3.837¢ per lb.	46.38 per gross ton	32.08 per gross ton
One month ago	3.837¢ per lb.	46.38 per gross ton	28.92 per gross ton
One year ago	3.705¢ per lb.	45.91 per gross ton	22.75 per gross ton

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1950	3.837¢ Jan. 3	3.837¢ Jan. 3	$46.38 Feb. 7	$45.88 Jan. 3	$32.42 May 16	$26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396c Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

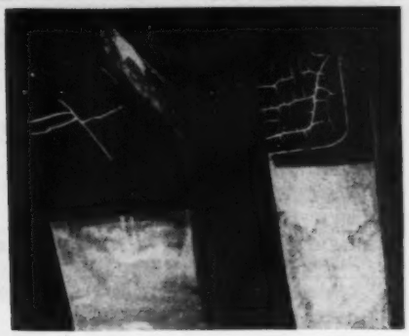
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron as Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Indications brought out by Magnaglo, glow under black light to clearly disclose a non-visible crack in car axle at wheel fit.

Magnaglo brings out a fluorescent indication, to locate typical crack in pinion gear of railroad diesel drive.



Zyglo brilliantly reveals cracks and poor bonding in these cutting tools. This method, like others employed with Magnaflux equipment is non-destructive and fast.

DEPEND ON MAGNAFLUX* for Fast, Accurate, Non-Destructive Testing of Metals, Non-Ferrous Materials and Ceramics

Luminous pattern by Magnaglo outlines forging crack in connecting rods shown above. Visual inspection would have missed this defect.

PUT MAGNAFLUX* TO ONE OR MORE OF THESE MANY USES

MAGNETIC METAL PRODUCTS
Use Magnaflux equipment to inspect welded, cast, forged, or rolled parts—Magnaglo where bright fluorescent indications speed inspection.

ULTRASONIC TESTING
Use Magnaflux-Sonizon for thickness measurement and location of defects.

CERAMICS TESTING
Use Statiflux for testing glass and glazed products. Use Partek on porous or unfired materials.

NON-MAGNETIC METALS
Use Zyglo to establish quality control on the production line or during overhaul.

STRESS ANALYSIS
Use Stresscoat where entire parts are tested for strain distribution under load or in use.

PLASTICS TESTING
Use Zyglo to find non-visible cracks that contribute weakness.

RAILROAD CARS, DIESELS and STEAM
Use Magnaflux-Magnaglo or Zyglo for checking every critical part.

ENGINEERED INSPECTION INSTALLATIONS
Available for testing at production line speeds.

Magnaflux* equipment in a great variety of applications, shows up defects in a wide variety of materials. Whether cracks are caused by heat, fatigue, or corrosion, Magnaflux* locates and defines each defect clearly and in its entirety...at lowest cost and at production line speed. The result is immediately visible. Write for detailed information on your specific inspection problem.

WRITE FOR DETAILED INFORMATION ON YOUR SPECIFIC INSPECTION PROBLEM

* *Magnaflux, Magnaglo, Zyglo: trademarks (Reg. U. S. Pat. Off.) of the Magnaflux Corporation applied to equipment and materials for use with magnetic particle and fluorescent penetrant inspection methods.*

MAGNAFLUX CORPORATION

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STATIFLUX • STRESSCOAT

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00 1													$50.00 31
Alloy, net ton	$51.00 1.17													$51.00 31
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00 1	$53.00 1	$53.00 1				$57.00 13		$53.00 3	$58.00 26	$53.00 3			
Carbon forging billets, net ton	$63.00 1	$63.00 1.4	$63.00 1.8	$63.00 4			$63.00 25		$63.00 3.4	$65.00 26	$63.00 3			$63.00 31
Alloy, net ton	$66.00 1.17	$66.00 1.4	$66.00 1		$66.00 4.42		$66.00 13	$66.00 3	$66.00 3.4	$68.00 26	$66.00 3			$66.00 31
SHEET BARS							$57.00 13							
PIPE SKELP	3.15 1						3.15 1.4							
WIRE RODS	3.85 2.18	3.85 2.4.33	3.85 6	3.85 2			3.85 6				3.85 3	3.95 3		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35 1.5.9.15	3.35 23	3.35 1.6.8	3.35 4.5			3.35 1.4.6.13		3.35 3	3.45 26		3.35 3		3.55 12
Cold-rolled	4.10[1.5] 7.9.15.63		4.10 1.6.8	4.10 4.15		4.10 7	4.10 4.6		4.10 3			4.10 3	4.30 22	4.30 12
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4		4.65[64] 4.75[44]					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1.8	4.40 4		4.40 7	4.40[6] 4.90[24]						4.60 22	4.70 12
Long ternes (10 gage)	4.80 9.15		4.80 1			4.80 7	4.80 64							
Hi Str. low alloy, h.r.	5.05 1.5.9	5.05 1	5.05 1.6.8	5.05 4.5			5.05 1.4.6.13		5.05 3	5.05 26		5.05 3		5.25 12
Hi str. low alloy, c.r.	6.20 1.5.9		6.20 1.6.8	6.20 4.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
Hi str. low alloy, galv.	6.75 1											6.75 3		
STRIP Hot-rolled	3.25 5.7.9.28	3.25 3.66	3.25 1.6.8	3.25 5			3.25 1.4.6.13		3.25 3	3.35 26		3.25 3		3.45 12.47
Cold-rolled	4.15 5.7.9.63	4.30 8.66	4.30 8	4.15 2.5		4.15 7	4.15 4.6.13.40.48.49		4.15 3			4.15 3		4.40[68-81] 4.35[12.47]
Hi str. low alloy, h.r.	4.95 9		4.95 1.6.8	4.95 5			4.95 1.4.6.13		4.95 3	4.95 26		4.95 3		5.15 12
Hi Str. low alloy, c.r.	6.20 9			6.20 2.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
TINPLATE‡ Cokes, 1.50-lb base box 1.25 lb. deduct 20¢	$7.50 1.5.9.15		$7.50 1.6.8				$7.50 4					$7.60 3	$7.70 22	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30 1.5.15		5.30 1.6				5.30 4					5.40 3	5.50 22	
BARS Carbon steel	3.45 1.5.9.17	3.45 1.4.23	3.45 1.6.8	3.45 4	3.45 4		3.45 1.4.6		3.45 3.4		3.45 3			3.65 12
Reinforcing‡	3.45 1.5	3.45 4	3.45 1.6.8	3.45 4			3.45 1.4.6		3.45 3.4		3.45 3	3.45 3		
Cold-finished	4.10[5] 4.15[2.4] 17.52.69.71	4.15[2] 23.69.70	4.15 4.73.74	4.15 2.61	4.15 4.32.82		4.15 6.40.57		4.15 70					4.35[12] 4.30[64]
Alloy, hot-rolled	3.95 1.17	3.95 1.4.23	3.95 1.6.8		3.95 4		3.95 1.6.25	3.95 3	3.95 3.4		3.95 3			4.25 12
Alloy, cold-drawn	4.90 2.17.52.69.71	4.90 2.23.69.70	4.90 4.73.74	4.90 2.61	4.90 4.42.82		4.90 6.25.57	4.90 3	4.90 3.70					5.05[64]
Hi str. low alloy, h.r.	5.20 1.5		5.20 1.6.8	5.20 4			5.20 1.6	5.20 3	5.20 3		5.20 3			5.40 12
PLATE Carbon steel	3.50 1.5	3.50 1	3.50 1.6.8	3.50 4			3.50 1.13		3.50 3	3.60 26	3.50 3	3.50 3		3.75 12
Floor Plates	4.55 1	4.55	4.55 3	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40	4.40 3		
Hi Str. low alloy	5.35 1.5	5.35 1	5.35 1.3	5.35 4.5			5.35 6			5.35 6	5.35 3	5.35 3		5.60 12
SHAPES, Structural	3.40 1.5.9	3.40 1.23	3.40 1.6.8					3.45 3	3.45 3		3.45 3			
Hi Str. low alloy	5.15 1.5	5.15 1	5.15 1.6.8				5.15 6	5.20 3	5.15 3		5.15 3			
MANUFACTURERS' WIRE Bright	4.50 2.5.18	4.50[2] 4.12.33.34		4.50 2.77			4.50 6	Kokomo=4.60[30]			4.50 3	4.60 3	Duluth=4.50[2] Pueblo=4.75[14]	
PILING, Steel Sheet	4.20[1.9]	4.20 1							4.20 3					

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
					INGOTS Carbon forging, net ton
	$59.00 83				Alloy, net ton
		$53.00 11	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00 83	$63.00 11	F=$82.00[19]	Geneva=$63.00[16]	Carbon forging billets, net ton
	$74.00 83		F=$85.00[19]		Alloy net ton
				Portsmouth=$55.00[20]	SHEET BARS
					PIPE SKELP
	4.25 83	3.85 11	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[20] Worcester=4.15[2]	WIRE RODS
		3.35 4,11	SF,LA=4.05[24] F=4.25[19]	Ashland=3.35[7] Niles=3.50[64]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10 11	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40 4,11	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
					Enameling (12 gage)
					Long terne† (10 gage)
		5.05 11	F=6.75[19]		Hi Str. low alloy, h.r.
			F=7.05[19]		Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85 83	3.65 83	3.25 11	SF, LA=4.00[24,62] F=4.40[19], S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=5.40[19] LA=5.55[27]	New Haven=4.65[2,68]	Cold-rolled
		4.95 11	F=6.65[19]		Hi Str. low alloy, h. r.
			F=6.95[19]		Hi Str. low alloy, c.r.
		7.60 11	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb. deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05 83	3.85 83	3.45 4,11	SF, LA=4.15[24] LA=4.15[62]	Atlanta=3.60[65]	BARS Carbon steel
4.05 83	3.85 83	3.45 4,11	SF, S=4.20[62] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55 83	4.35 83		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[2]=5.20 Hartford=5.20[4]	Alloy, cold-drawn
		5.20	F=6.25[19]		Hi Str. low alloy, h.r.
	3.90 83	3.50 4,11	F=4.10[19] S=4.40[62] Geneva=3.50[16]	Claymont=3.80[29] Coatesville=3.60[21] Harrisburg=3.50[35]	PLATE Carbon steel
				Harrisburg=4.55[35]	Floor plates,
			F=5.40[19]	Coatesville=4.50[21]	Alloy
		5.35 11	F=5.95[19]	Geneva=5.35[16]	Hi Str. low alloy
4.00 83	3.80 83	3.40 11	SF=3.95[62] LA=4.00[24,62]	Phoenixville=3.30[56] Geneva=3.40[16]	SHAPES, Structural
		5.15 11	F=4.00[19] S=4.05[62]	Fontana=5.75[19] Geneva=5.15[16]	Hi Str. low alloy
5.10 83	4.90 83	4.50 4,11	SF, LA=5.45[24,62]	Portsmouth=4.50[20] Worcester=4.80[2]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes deduct $1.15 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principle Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit

CARNEGIE-ILLINOIS LIBRARY

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.50	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	6.20
Electrical	6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

MERCHANT WIRE PRODUCTS

To dealers, f.o.b. mill	Base Column	Pittsburg, Calif.
Standard & coated nails*	106	125§
Woven wire fence†	116	139
Fence posts, carloads††	116	...
Single loop bale ties	113	137
Galvanized barbed wire**	126	146
Twisted barbless wire	126	146

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

	Base per 100 lb	Pittsburg, Calif.
Merch. wire, annealed‡	$5.35	$6.30
Merch. wire, galv.‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.
§ Torrance, 126.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Pittsburg, Torr., Calif.; Seattle	4.35
Track bolts, untreated**	8.85
Track bolts, heat treated, to railroads**	9.10

** Minnequa, deduct 25¢. † Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about $200.00 per net ton

Standard, T & C

Steel, Buttweld*	Black	Galv
⅛-in.	40½ to 38½	24 to 22
¼-in.	43½ to 41½	28 to 26
1-in.	46 to 44	31 to 29
1¼-in.	46½ to 44½	31½ to 29½
1½-in.	47 to 45	32 to 30
2-in.	47½ to 45½	32½ to 30½
2½ to 3-in.	48 to 46	33 to 31
Steel, lapweld		
2-in.	38	32½
2½ to 3-in.	42	36½
3½ to 6-in.	43 to 40	27½ to 24½
Steel, seamless		
2-in.	36	20½
2½ to 3-in.	39	23½
3½ to 6-in.	41	25½
Wrought Iron, buttweld		
⅛-in.	+26½	+53
¼-in.	+16½	+42
1 & 1¼-in.	+10½	+33
1½-in.	+ 4½	+29½
2-in.	+ 4	+29
Wrought Iron, lapweld		
2-in.	+13½	+37
2½ to 3½-in.	+11	+32½
4-in.	+ 6	+26½
4½ to 8-in.	+ 8	+28
9 to 12-in.	+18	+37½

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	39½ to 37½	24½ to 22½
¼-in.	43½ to 41½	28½ to 26½
1-in.	45½ to 43½	31½ to 29½
1¼-in.	46 to 44	32 to 30
1½-in.	46½ to 44½	32½ to 30½
2-in.	47 to 45	33 to 32
2½ to 3-in.	47½ to 45½	33½ to 31½
Steel, lapweld		
2-in.	37	22½
2½ to 3-in.	42	27½
3½ to 6-in.	44½ to 41½	30 to 27
Steel, seamless		
2-in.	35	20½
2½ to 3-in.	38	24½
3½ to 6-in.	42½	28
Wrought Iron, buttweld		
⅛-in.	+22	+47
¼-in.	+15½	+40
1 to 2-in.	+ 5½	+29
Wrought Iron, lapweld		
2-in.	+10½	+33½
2½ to 4-in.	+ 1	+22
4½ to 6-in.	+ 5	+26½
7 & 8-in.	list	+21½
9 to 12-in.	+11½	+29½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric H.R.	Weld C.D.
2	13	$20.61	$24.24	$19.99	$23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

Prices continued on next page

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.05	6.24–6.44[1]	6.46–6.46[2]	5.59–5.59[11]	....	5.20–5.64[11]	5.49	5.49–5.49[11]	6.19	9.69	9.99	11.12	11.49
Birmingham*	5.05[10]	5.80	6.15[7]	5.10[10]	....	5.20	5.05	5.00[10]	6.73	....	....	....	....
Boston	5.73	6.48[20]–6.85	6.79–7.24[21]	5.78	6.90–6.95	5.88	5.55	5.60	6.30–6.58	9.70–9.97	9.59–10.37	11.15	11.45
Buffalo	5.05	5.80	6.80	5.41	7.27	5.45	5.15	5.05	5.75	9.60	9.90	11.05	11.35
Chicago	5.05	5.80	6.70	5.10	6.80	5.20	5.05	5.00	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.32–5.97	5.80–6.24	6.29–6.39	5.48	....	5.59–5.74	5.44–5.59	5.39–5.54	6.10–6.25	9.80–9.81	9.90–10.11	11.05–11.26	11.35–11.56
Cleveland	5.05	5.80	6.95	5.24	6.35	5.32	5.17	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.08	7.09	5.49	6.27–6.58	5.59	5.44	5.39	6.03	9.56	9.86	11.01	11.31
Houston	5.75	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35–10.45	10.50–10.60	11.50	11.95–12.10
Indianapolis	....	....	....	....	7.36	....	....	....	....	....	....	....	....
Kansas City	5.65	6.40	7.30	5.70	6.95	5.80	5.65	5.60	6.35	9.85	10.15	11.30	11.60
Los Angeles*	5.80	7.00	7.50[2]	5.85	8.35[16]	5.80	5.70	5.80	7.55	10.05	10.20	11.70	12.10
Memphis	5.93	6.68	....	5.98	6.80	6.08	5.93	5.68	....	....	....	....	....
Milwaukee	5.19	5.94	6.84	5.24	6.32	5.34	5.19	5.14	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.50[1]	6.85[1]	....	5.55[1]	6.90[1]	5.65	5.55[1]	5.55[1]	6.75	....	....	....	....
New York	5.55–5.65	6.54–6.64[1]	6.90–7.05[2]	5.84	6.76[3]	5.70	5.45	5.60	6.44	9.60	9.90	11.05	11.35
Norfolk	6.10	7.00	....	6.30	....	6.15	6.20	6.15	7.20	....	....	....	....
Omaha	....	....	....	....	....	....	....	....	....	....	....	....	....
Philadelphia*	5.30	6.20	6.70[2]	5.65	6.29	5.45	5.25	5.50	6.21	9.35	9.65	10.80	11.10
Pittsburgh	5.05	5.80	6.45	5.20	6.00	5.15	5.05	5.00	5.75	9.25	9.55	10.70	11.00
Portland	6.60–7.10[1]	8.40[2]	8.20[2]	6.85[9]	....	6.40[9]	6.50	6.45–6.45[9]	8.60[14]	12.00[18]	11.60[18]	....	....
Salt Lake City	5.85	6.70	8.75	7.45	8.75	6.10[3]	5.90	7.35[3]	8.75	....	....	....	....
San Francisco	6.25[11]	7.60[2]	7.50[2]	6.75[11]	7.85[16]	6.15[11]	6.00[11]	6.15[11]	7.55	10.05	10.20	11.70	12.10
Seattle	6.60[4]	8.15[2]	8.20[2]–8.35[2]	6.85[4]	....	6.35[4]	6.20[4]	6.35[4]	8.50[14]	....	11.60[18]	....	13.60[18]
St. Louis	5.38	6.13	7.05	5.43	6.68–7.54	5.53	5.38	5.33–5.35	6.08	9.58	9.88	11.03	11.33
St. Paul	5.61	6.36	7.26	5.66	6.16–6.82	5.76	5.61	5.56	6.31	9.81	10.11	11.26	11.56

BASE QUANTITIES: (*Standard unless otherwise keyed on prices.*)
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	41.88	42.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.50	51.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	46.00	46.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	46.00	46.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	46.00	46.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	48.58	49.08	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	.....
Philadelphia	Steelton	3.09	.....	.....	.....	.....	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

Cast rings produced by the CENTRI-DIE method—rough and finished machined. Note the variations in diameters and metal sections.

Lebanon CENTRI-DIE Castings

TRADE-MARK

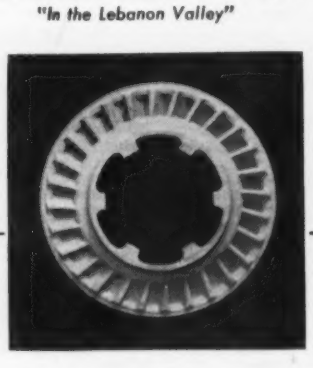
finest for... **Jet Engine Applications • Bushings • Valve Seats • Pump Liners • Other cylindrical and circular shapes used particularly in the oil, textile, chemical, paper and pulp industries.**

CENTRI-DIE, an exclusive process at Lebanon, brings to this country a unique method of casting cylindrical shapes in permanent molds. CENTRI-DIE castings are easier to machine and have improved physical properties: greater density, more uniform strength, finer grain size with better directional flow characteristics. New corrosion and heat resistant alloys, difficult to forge, are often used in CENTRI-DIE castings.

Lebanon has complete facilities for laboratory testing, including a million-volt X-Ray machine. All CENTRI-DIE castings can be made to conform to aircraft specifications.

Write for descriptive literature or contact our engineers; we are always glad to be of service.

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In the Lebanon Valley"



Lebanon also is a major producer of centrifugal castings made in refractory molds—illustration shows typical casting made by this process.

LEBANON ALLOY AND STEEL **Castings**

CIRCLE L

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List	
	Less Case	C.
½ in. & smaller x 6 in. & shorter	27	38
9/16 & ⅝ in. x 6 in. & shorter	29	40
¾ in. & larger x 6 in. shorter	26	37
All diam, longer than 6 in.	22	34
Lag, all diam over 6 in. & longer	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	25	37
9/16 to ⅝ in.	23	35
¾ to 1½ in. inclusive	23	35
1⅝ in. and larger	16	29

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List		
	Reg	Hvy	Lt
½ in. and smaller	41	35	41
9/16 to ⅝ in.	36	30	36
¾ to 1½ in.	31	27	33
1⅝ in. and larger	21	17	..

In full case lots, 15 pct additional discount.

Stove Bolts

	Pct Off List
Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.	$7.25

Small Rivets

(7/16 in. and smaller)
Pct Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¼ in. through ⅝ in. x 6 in. and shorter high C heat treated	54
Milled studs	23
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.15¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

ELECTRODES

Cents per lb., f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
	CARBON	
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
20	84, 90	7.50¢
17	60, 72	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct, Coatesville, Pa. (21)	•26.50	
Washgtn, Pa. (39)	•26.50	
Claymont, Del. (29)	•26.50	
Conshohocken, Pa. (26)		•22.50
New Castle, Ind. (55)	•26.50	•24.00
Nickel-carbon 10 pct, Coatesville (26)	27.50	
Inconel-carbon 10 pct, Coatesville (21)	36.00	
Monel-carbon 10 pct, Coatesville (21)	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		75.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

• Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium	57.5¢
Oil hardened manganese	32¢
Special carbon	29.5¢
Extra carbon	24.5¢
Regular carbon	21¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

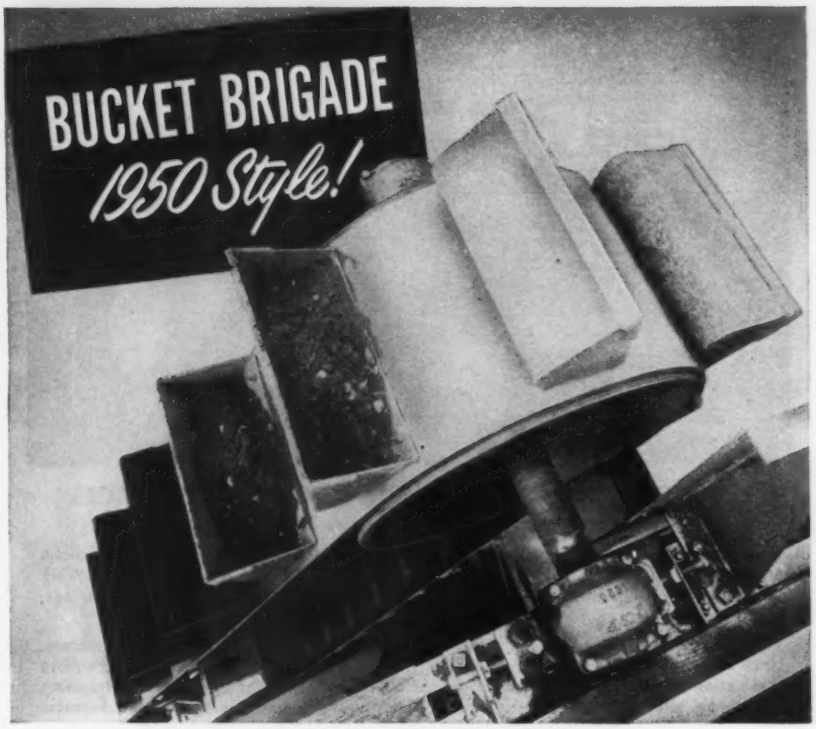
	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$24.00
Chicago, f.o.b.	21.00
Detroit, f.o.b.	20.40
New England, del'd	23.40
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	21.25
Swedeland, Pa., f.o.b.	21.20
Painesville, Ohio, f.o.b.	21.90
Erie, del'd	$21.04 to 21.25
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, del'd	21.60
Birmingham, del'd	20.20

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net; Effective CaF, content:

70% or more	$37.00
60% or less	34.00

Prices Continued on Next Page



Bucket elevators deliver more material at less cost per ton when the belting is *matched to the load.*

That's why so many elevator operators turn to Hewitt-Robins for their belting. They know that Hewitt-Robins Elevator Belting will give long, low-cost service under today's high-pressure production schedules . . . whether the material handled is wet or dry, hot or cold, abrasive or smooth, heavy or light. They know Hewitt-Robins belting is designed to withstand the pull of bucket bolts, the abrasion caused by lumps caught between boot pulley and belt, the wear from belt slippage . . . all the other abuses of day-in, day-out elevator service.

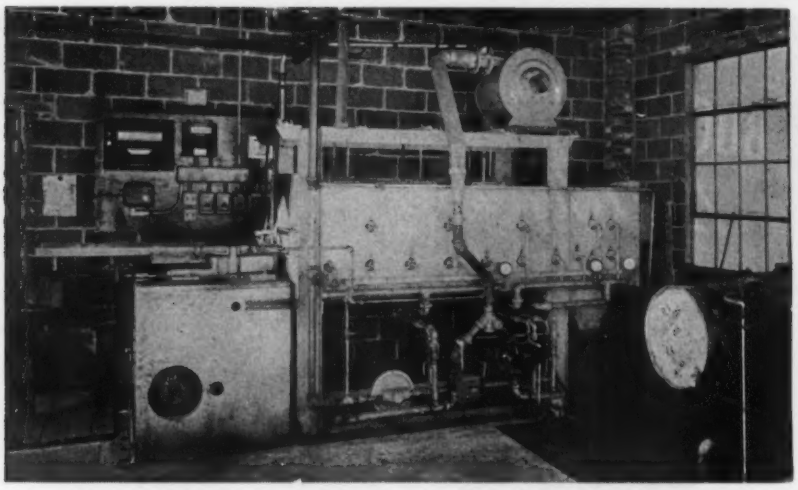
Whatever the job to be done, there's a Hewitt-Robins Elevator Belt to match the load—ore, rock, stone, coal, sand, gravel, ashes, cement, pulp—to match *your* load, whatever it is! Use Maltese Cross® and Monarch® where only the best is tough enough, Ajax® and Conservo® for general service. In every one, you get *more for your money*—in longer, trouble-free life . . . and in *more material moved at a lower cost per ton.*

For the whole story of what goes into these belts to make them so good, call your Hewitt Rubber Distributor (listed under "Rubber Products" in the classified phone book), or write Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, New York.

HEWITT-ROBINS
ELEVATOR BELTING

HEWITT-ROBINS HR INCORPORATED

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS
CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS
FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS
RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS
TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS



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SUITED TO WIDE RANGE OF GENERAL AND ATMOSPHERE WORK

VERSATILE. A.G.F. Reciprocating Furnaces are suited to continuous clean hardening, annealing, normalizing, case-hardening by the patented Ni-Carb process, etc. Work treated in the same furnace may range from extremely small light springs, stampings, drop forgings, etc., up to quite large and heavy pieces.

THE RECIPROCATING MUFFLE advances work through the heat by its own momentum. Heat losses and maintenance problems are reduced to a minimum by the complete elimination of conveying mechanism from the heating chamber. There is no traveling belt to be alternately heated and cooled—only work enters and leaves the furnace.

Write for Bulletin 815-AB today.

AMERICAN GAS FURNACE CO.

1004 LAFAYETTE ST., ELIZABETH, N. J.

Enthusiastic Customers do our BEST advertising

True Temper Corporation, manufacturers of True Temper Products, use fourteen Grand Rapids Hydraulic Feed Surface Grinders in ten of their factories. The machine shown is a Model 55A.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

GRAND RAPIDS GRINDERS

to serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GALLMEYER & LIVINGSTON COMPANY

200 Straight, S. W., Grand Rapids 4, Mich.

REFRACTORIES (*F.o.b. works*)

Fire Clay Brick	*Carloads, Per 1000*
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$86.00
No. 1 Ohio	80.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	80.00
No. 2 Ohio	72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	14.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$86.00
Childs, Pa.	90.00
Hays, Pa.	91.00
Chicago District	95.00
Western Utah and Calif.	101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago	106.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	15.00
Silica cement, net ton, bulk, Hays, Pa.,	17.00
Silica cement, net ton, bulk, Ensley, Ala.	16.00
Silica cement, net ton, bulk, Chicago District	16.00
Silica cement, net ton, bulk, Utah and Calif.	22.50

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick	
Standard, Baltimore	$91.00
Chemically bonded, Baltimore	80.00

Grain Magnesite	*St. ⅜-in. grains*
Domestic, f.o.b. Baltimore, in bulk fines removed	$56.00 to $57.00
Domestic, f.o.b. Chewelah, Wash., in bulk	33.00
in sacks	38.00

Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	31.50¢
Brass, 10 ton lots	23.50¢ to 27.25¢
Copper, electrolytic	27.75¢
Copper, reduced	27.00¢
Cadmium, 100-199 lb	$2.95
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	17.00¢
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	56.00¢ to 66.00¢
Nickel, annealed	72.00¢
Nickel, spherical, unannealed	69.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal values
Stainless steel, 302	75.00¢
Tin	85.75¢
Tungsten, 99%	$2.90
Zinc, 10 ton lots	15.75¢ to 18.50¢

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$91.80 to $95.30
6 to 24-in. del'd N. Y.	91.00 to 92.00
6 to 24-in., Birmingham	78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $112.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

Prices Continued on Page 156

She's dividing the plus and the minus

Here's one way the "quiet" is built into a Federal Ball Bearing . . . in the *selective assembly* of balls and race-rings of matching dimensions.

Federal-manufactured balls are uniformly spherical within .000025" . . . never vary more than .00005" in any one bearing. The ball track is ground to a chatter-free finish and just the right radius. And only precisely gauged balls and race-rings of similar plus-or-minus dimensions are combined.

After all tolerances and dimensions are checked, Federal Ball Bearings are tested for quiet running, smoothness, parallelism and fit. That's why, when you need a power-saving bearing that permits heavier load margins at higher speeds, "Federals" are equipped to carry out your specifications.

Over one hundred production, inspection and *cleaning operations*, with *every fourth operator an inspector*, provide the assurance that there's friction-free, long-lasting performance in *every* Federal Ball Bearing.

Your application may benefit from a Federal Ball Bearing installation. Our representative in your vicinity will be glad to call and discuss it with you. Why not call him in now? Or write for our catalog "K." It describes the full range of Federal Ball Bearings.

THE FEDERAL BEARINGS CO., INC. · POUGHKEEPSIE, NEW YORK

Makers of Fine Ball Bearings

Quality since 1908

FEDERAL BALL BEARINGS

ONE OF AMERICA'S LEADING BALL BEARING MANUFACTURERS

Brass • Bronze
Stainless • Monel
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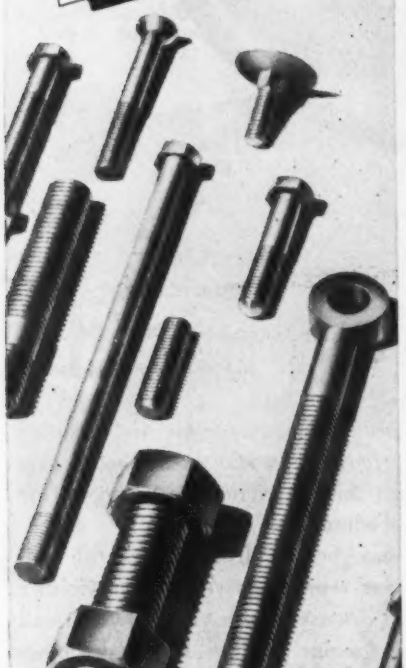
BOLTS NUTS
STUDS

Here's a full line of bolts, nuts and studs in all types of metals. Accurately threaded to assure a uniform Class 3 Fit. Pawtucket products are made in standard dimensions or to your specifications.



BETTER BOLTS SINCE 1882
Use Headed and Threaded Fasteners for Economy and Reliability

PAWTUCKET
"THE BOLT MAN"
MANUFACTURING COMPANY
327 Pine Street Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

FERROALLOYS

Ferromanganese

78-83% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Manganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 18.15¢

Low-Carbon Manganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	17.00	75% Si	13.50
50% Si	11.30	85% Si	14.65
90-95% Si			16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.25
2.00% C			27.00
65-69% Cr, 4-9% C			20.50
62-66% Cr, 4-6% C, 6-9% Si.			21.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.55

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	$1.09
0.50% max. C	1.05
9.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

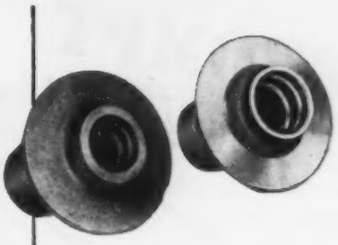
SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

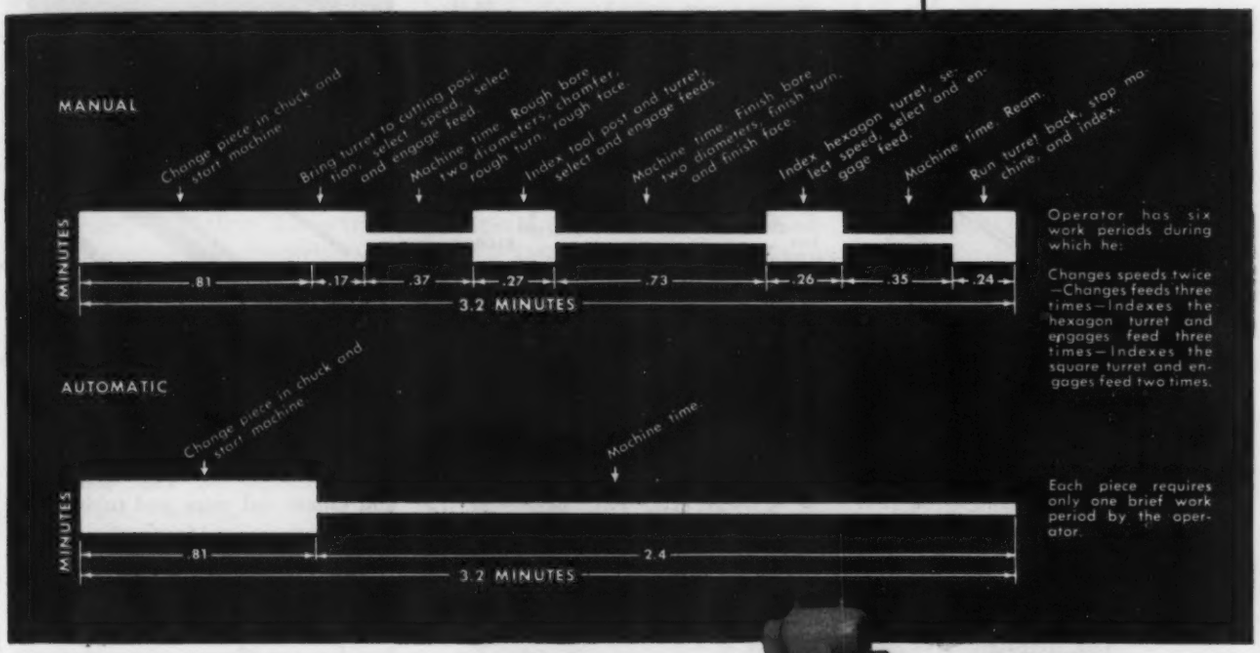
Ton lots	17.25
Less ton lots	18.50

Prices Continued on Page 158

how the GISHOLT FASTERMATIC saves man-minutes and money!



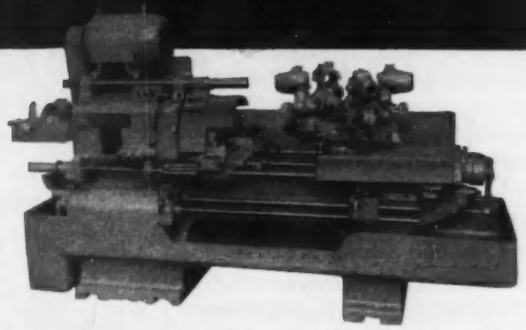
Here is an actual comparison of the time and work cycle of a manually operated turret lathe and a Gisholt Fastermatic Automatic Turret Lathe. The machining of wheel hubs, shown above, requires 6 operations as follows: rough bore, finish bore, ream, rough face, finish face and chamfer. Note that the manually operated machine takes over 54% of the operator's time whereas the Fastermatic takes only 25% of his time, leaving 75% without interruption.


MANUAL
Change piece in chuck and start machine.
Bring turret to cutting position, select speed, select and engage feed.
Machine time. Rough bore two diameters, chamfer, rough turn, rough face.
Index tool post and turret, select and engage feeds.
Machine time. Finish bore two diameters, finish turn, and finish face.
Index hexagon turret, select speed, select and engage feed.
Machine time. Ream.
Run turret back, stop machine, and index.
MINUTES
.81
.17
.37
.27
.73
.26
.35
.24
3.2 MINUTES
Operator has six work periods during which he:
Changes speeds twice —Changes feeds three times—Indexes the hexagon turret and engages feed three times—Indexes the square turret and engages feed two times.
AUTOMATIC
Change piece in chuck and start machine.
Machine time.
MINUTES
.81
2.4
3.2 MINUTES
Each piece requires only one brief work period by the operator.

That's the story of the Fastermatic in a nutshell—less work time for the operator. The Fastermatic handles all changes of feeds and speeds automatically.

In this case, for example, the other side of the work piece is done by another Fastermatic with substantially the same cycle. One operator keeps both machines constantly under cut and still has ample time for stacking and work inspection. Important, too, is the fact that both Fastermatics are tended by a comparatively unskilled operator.

There are many such cases where Fastermatics can cut costs substantially. Gisholt engineers will gladly answer your questions. Write us.



THE GISHOLT 1-F FASTERMATIC—*smallest of 3 different sizes which enable you to machine a maximum number of surfaces in one chucking, handling all changes in speed and feed automatically. On this job, turret was double-tooled so that two parts were completed with each revolution of the turret. Ask for literature.*

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

GISHOLT

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.*

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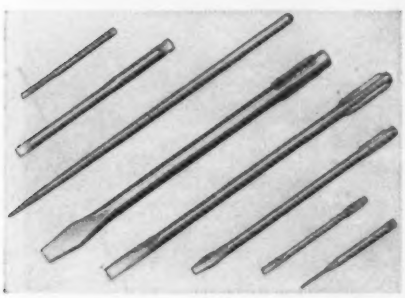
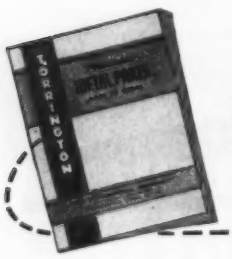


You save time and money when you rely on our high productive capacity and special equipment to turn out precision parts made to your order.

We produce thousands of different parts. For example, screw driver and ice pick blades are made to order for assembly in any type of handle. Driver points keystone or cabinet. Uniformly ground edges. Winged, fluted, formed or milled shanks. Plain, blued or nickel plate finish.

Send your prints and specifications today for a prompt quotation, and ask for a copy of "Precision Metal Parts".

THE TORRINGTON COMPANY
Specialty Department
555 Field Street • Torrington, Conn.



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Firm_____

Address_____

5

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
- Carload ..... 7.65¢
- Ton lots ..... 9.05¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo ..... 96¢

Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.
- Ton lots $3.50
- Less ton lots..... 3.55

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $2.67

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.13

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload..... 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.28

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.40
Less ton lots..... 1.45

Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $160.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $2.25

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
- Openhearth $2.90
- Crucible 3.00
- High speed steel (Primos)..... 3.10

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. ..... 95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa. ..... 94¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk, lump..... 11.00¢
- Ton lots, bulk, lump..... 11.50¢
- Less ton lots, lump..... 12.25¢

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
- Carload, bulk..... 6.60¢

Boron Agents

Contract prices, per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B..... $4.25

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound..... 45¢
- Less ton lots, per pound..... 50¢

Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.
- Ton lots, per pound..... 8.625¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots..... $1.20
F.o.b. Wash., Pa.; 100 lb, up
- 10 to 14% B..... .75
- 14 to 19% B..... 1.20
- 19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
- No. 1 ..... 93¢
- No. 6 ..... 63¢
- No. 79 ..... 45¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
- Ton lots $1.67
- Less ton lots..... 1.79

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
- Less ton lots..... $1.80

Silcaz, contract basis, delivered.
- Ton lots ..... 45.00¢

toughen metal

improve surface

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The Torrington Rotary Swaging Machine delivers 4000 hammer blows a minute...reduces, sizes, rounds, points and tapers rod, wire and tubing... work-hardens metal for toughness and resilience...produces a burnished surface... utilizes every bit of stock.

Torrington Swager performance is based on our 42 years of swaging experience. Send the coupon for your free copy of the booklet illustrating the machines and describing the art of rotary swaging.

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Swager Department
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5

NISA Sponsors Idea Contest; Will Give Awards at Conventions

St. Louis—In conjunction with its 1950 convention, the National Industrial Service Assn. is sponsoring a contest for good ideas, methods, or gadgets that will benefit firms in the electric motor service industry. Fourteen prizes totaling $300 will be awarded at the convention to be held at the Boston Statler, June 4 to 7.

The awards include a first prize of $100, a second prize of $75, a third prize of $50, a fourth prize of $25, and ten honorable mentions of $5 each. Anyone may enter the contest.

Contest rules specify that all entries must pertain to the electrical repair industry. All entries become association property and will be used by member firms for their benefit. Entries will be submitted to the award committee, care of executive secretary, NISA, 818 Olive St., St. Louis 1, with the name and address of contestant.

Entries may be submitted by photograph, sketch, written description, or working model. Acceptance of entries ends on May 25, 1950. The decision of the award committee will be final.

Tramway Div. Head Picked

San Francisco—Announcement recently made by Columbia Steel Co. of the appointment of Gordon H. Bannerman to head up the newly created Tramway Division of the company indicates the probability of furtherance of the plan to build a 13,000 ft tramway from a point near Palm Springs, Calif., to a point 8,500 ft high on Mt. San Jacinto.

This project has been in the offing since 1945 when the winter park authority was set up by the state and preliminary surveys were made to determine the feasibility of this tramway to establish a year-round resort area. Mt. San Jacinto has an elevation of more than 10,000 ft and reportedly provides fine skiing facilities.

Mr. Bannerman, while still employed by American Steel & Wire Co., conducted preliminary surveys of the project and it is understood that Consolidated Western Steel Corp. was interested in the design of the cables supporting towers. As tentatively planned, the tramway would be built in two sections and carry passengers from an elevation of 2638 ft to an elevation of 8515 ft. Passengers would be brought to the tramway starting point by bus from Palm Springs, approximately four miles distant. Initial estimates of the project were said to approximate $3 million but later revisions indicate a cost closer to $9 million.

Kellner Gets New Scrap Post

New York—Formerly of Luria Brothers & Co., Inc., Phillip Kellner is now connected with the new Brooklyn scrap yard of Lipsett Steel Products, Inc. of New York.

Outlook Brighter than Predicted

Salt Lake City — With the approach of good construction weather, the outlook for steel fabricators of this area is brighter than most of them were willing to forecast during the winter. The Utah Department of Employment Security predicts the highest construction employment during the spring and summer since the end of the war.

Scheduled projects, according to the department, are substantially greater in number and size than in 1949, which was a good construction year. The same situation exists in southern Idaho.

Projected construction is not concentrated in any one category. It is made up of sizable public and private programs, and the private is well-balanced as between residential, commercial and industrial.

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QUALITY INDUSTRIAL FASTENERS
BOLTS • NUTS
RIVETS and SCREWS...
...have greater holding power!
• Accuracy of product finish...uniformity of product quality have maintained Clark Leadership for 97 years.
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Propose Revision to Iron, Steel Roofing Recommendation

Washington—A revision of Simplified Practice Recommendation R78-28, Iron and Steel Roofing, approved by the Standing Committee, has been submitted to producers, distributors, users, and others interested for acceptance or comment, according to the National Bureau of Standards.

This recommendation, originally issued in 1928, consists of a simplified list of widths, lengths, and gages of several styles and forms of iron and steel roofing and siding, galvanized or painted.

Same Products Covered

The revision proposed by the Texas Chapter of the American Steel Warehouse Association, Inc. covers the same products and adds siding and ridge roll. Eight lengths of corrugated V-crimp and pressed standing seam products would be reduced to four by the revision.

Roll roofing remains unchanged at 50-ft lengths. Corrugated roofing and siding, formerly listed in three gages, would be increased to seven gages. These include gages heavier than 24 gage.

Adds Lighter 29 Gage

V-crimp and pressed standing seam styles previously listed in two gages are now listed in three gages, adding the lighter 29 gage. Roll roofing remains unchanged at three gages. The widths for the various products are unaltered, but these are now specified as formed, covering, or actual width. The revision has details of plain and corrugated ridge roll, width, gages, and lengths.

Mimeographed copies of the proposed revision may be obtained from the Commodity Standards Division, National Bureau of Standards, Washington 25.

Here is the answer to your Spring Problems!
A Handbook on Springs free for the asking
If you are designing or making a product requiring a spring in its assembly, you will want this book—a 28-page handbook of engineering data on springs—28 pages of formulas, graphs, charts, tables and drawings. This book will tell you all you need to know about specifying springs of any type from light wire to heavy elliptic leaf springs. It's yours for the asking—write for your copy today.
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Pension Pact Approved

Pittsburgh — Blaw-Knox Co. stockholders have approved the pension and social insurance programs negotiated by the company with the United Steelworkers of America, CIO.

At the company's annual meeting, William P. Witherow, president, reported that effects of the steel and coal strikes as well as the company's foundry modernization program hurt production and shipments and reduced earnings during the first quarter.

Earnings for the first three months were $276,658, as compared with $925,976 in the same period of 1949. The company's backlog of unfilled orders rose $1 million to $22 million.

Allegheny Steel Approves Pension

New York—Allegheny Ludlum Steel Corp. stockholders approved company-financed pension plans for production and salaried employees. To be combined with and supplement the present employee participation insured annuity plan, this program will be retroactive to Jan. 1, 1950, if approved by the Bureau of Internal Revenue. Both plans similarly provide for minimums of $100 per month including social security for workers of 25 years' service at 65.

"Wait 'til the boss sees this!"

ECA Contracts for Europe Aid

Washington—The Economic Cooperation Administration has signed an industrial convertibility guarantee, in the amount of $175,000, with the Hunter Douglas Corp. of New York and Riverside, Calif.

The company will send machinery and other equipment to Rotterdam, Holland, for establishment of a factory to manufacture aluminum slats and other venetian blind materials.

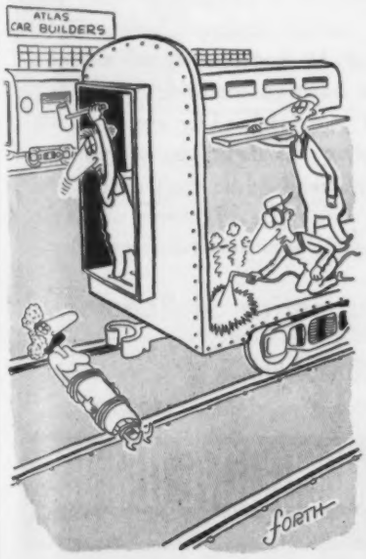
Anaconda Coppers Listed

New York—Anaconda Copper's most generally used alloys, specifications, and description of materials are listed in the new 1950 edition of "Copper and Copper Alloy Specifications Index." The 2-part 28-page booklet was published by the American Brass Co., Waterbury, Conn. Copies are available on request to Publication B-34, Third Edition.

Mechanical Stoker Sales Drop

Washington — Reflecting unsettled conditions in the coal industry, 1949 factory sales of mechanical stokers dropped 60 pct for residential and other small types and about 35 pct for the larger commercial types.

Total sales by type, the Census Bureau reports, were: residential, 26,372; small apartment and small commercial, 2939; large apartment and medium commercial, 3520; and steam plant and other large commercial, 2429.



Auto Sales in '50 Top '49

Detroit—First quarter auto factory sales in America were at the annual rate of about 6,500,000 vehicles and totaled 1,635,966 new vehicles to top '49 same period production by 142,000 units or 19 pct, reported the Automobile Manufacturers Assn.

GM Labor Turnover Slows

Detroit—Labor turnover in General Motors had far more stability in 1949 than in the previous year, announced George A. Jacoby, director of the Personnel Services Section. He said that 24,213 fewer employees quit their jobs in '49 than in '48. Last year GM hired 130,000 new workers for its expanded facilities.

Credit Arm Will Finance Ford and Dearborn Equipment

Detroit — Dearborn Motors Corp., marketing organization for the Ford Tractors and Dearborn Farm Equipment, has organized a financing subsidiary, Dearborn Motors Credit Corp.

Officers of the organization are: Frank R. Pierce, president; B. A. Best, vice-president and treasurer; A. N. Willis, vice-president and general manager and Clifton G. Hassberger, secretary.

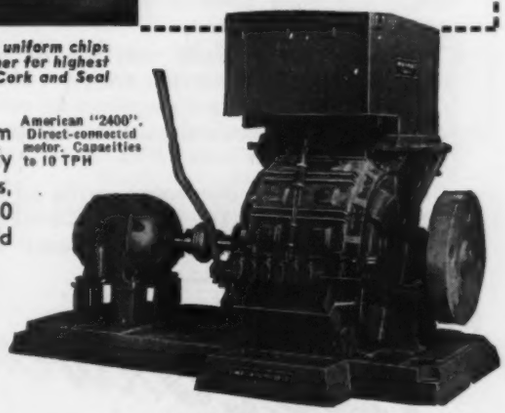
The organization will serve farmers, other customers, and Dearborn distributors and dealers. Banks and financial agencies will continue to finance time purchases of buyers of Ford tractors and farm equipment, it is explained.

The firm opened for business at Detroit April 15. Permanent offices will be in the new $3 million office building, agricultural research center and warehouse now under construction near Birmingham, Mich.

CUTTING-OIL RECOVERY can buy an AMERICAN TURNINGS CRUSHER

Segregated turnings are reduced to uniform chips by an American Shredder Ring Crusher for highest cutting oil recovery at the Crown Cork and Seal Co., Baltimore.

The cutting oil reclamation from chips produced from long, curly turnings of steel, alloys, brass, aluminum, etc., increases to 30 to 50 gallons per ton. This yield *plus* the savings in storage space and handling along with higher scrap value of short shovel chips pays for an American Turnings Crusher.



American "2400". Direct-connected motor. Capacities to 10 TPH

Write for information bulletin entitled "Metal Turnings Crusher"

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Originators and Manufacturers of Ring Crushers and Pulverizers

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OUTLAST COMPETITION 3 to 1

says the Bastian Blessing Company, Chicago manufacturer of soda fountains and equipment. Here power-driven brushes are used to satin finish brass parts and debur small threaded parts.

Frequent breakdowns and changes forced the company to seek a superior brush. From a wide variety of makes, Bastian Blessing selected Pittsburgh brushes because *"these lasted three times as long as the nearest competitive brush tested,"* . . . were softer, more flexible, and lasted longer . . . gave a better finish.

After three years of use, the company reports: *"Increased production, improved quality and greater material savings."*

Let "PITTSBURGH" skilled brush engineers show you what they can do

Just tell us your special brush problems and our staff of skilled engineers will quickly, efficiently design and build power-driven brushes to meet your requirements precisely.

Or you may find exactly what you are looking for in our regular Pittsburgh line . . . which includes sections, wheels and assemblies for every industrial use, whether it's glass, steel, or plastics . . . paper, tires, shoes or automobiles.

For additional information, write or phone **PITTSBURGH PLATE GLASS COMPANY, *Brush Div.,* Dept. W-10, 3221 Frederick Ave., Baltimore 29, Maryland.**

PITTSBURGH *Power Driven* **BRUSHES**

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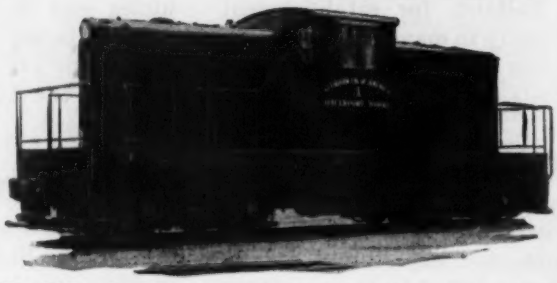

This 80-Ton Davenport Diesel Electric Locomotive, 56½" Gage, is on duty at one of Aluminum Corporation of America's newest and largest plants.

THE more important intra-plant haulage is to an industrial operation the MORE LOGICAL it is to choose Davenport Better-Built Locomotives to do the work.

DAVENPORT LOCOMOTIVES

DAVENPORT *BETTER-BUILT* **LOCOMOTIVES** *are AVAILABLE in* **STEAM GASOLINE DIESEL** *with* **ELECTRIC** *or* **MECHANICAL DRIVE**

For a half century Davenport Locomotives have demonstrated their ability to deliver haulage satisfaction at lowest ton-mile costs, through extra years of trouble-free service life.

The inbuilt stamina, the simple controls and the ample and responsive power of Davenports combine to put Profit-Power on your rails.

WE ANALYZE YOUR NEEDS

It will be a pleasure to send you our latest Haulage Survey Data Sheet to enable you to describe your haulage conditions accurately and completely. Our engineers will analyze the data you submit and recommend, without obligation, the size and type of power unit best suited to your particular operations.

Complete Information on Request

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If you want to save money on pressed steel parts, call on Budd's wide experience in steel stampings of all kinds.

Like hundreds of manufacturers, you can take advantage of Budd "know-how" to lower production costs on blanks and stampings, in both regular grade and stainless steel. At your service Budd places the best-equipped machine shop—for both large and small dies—on the Atlantic seaboard.

Write today, sending a sample, blueprint or pencil sketch of your product, and let us quote you a price.

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IT'S S&S, AS USUAL, FOR A LARGE, DIVERSIFIED STOCK OF TOOLROOM & PRODUCTION MACHINERY

"Buy" of the Week!

U-27 Lodge & Shipley axle turning & Deep Hole Drilling Latho, Geared Head.

Length of bed 30', Max. length of hole drilled 11' 6". Swing over ways 31", Swing over carriage 15".

Travel of drill head 14', Pan bed. Revolving steady rest.

Planers	Brakes		
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	Lapping Machs	Jig Borers	Headers

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Many complete plants for sale or assembled to order . . . everywhere.

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PRECISION
DROP FORGINGS
...any size or shape up to 200 lbs.
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ABRASIVE CUTOFF MACHINES
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3-H.P. line—wet and dry cutting, bevel or rt. angle. Capacity: ¾" solids; 2" tubing; 2" x 6" lt. sheet formed sections; ½" x 1" flats.

10-H.P. line—wet cutting, rt. angle or bevel. Capacity: 2½" solids; 3" x ⅜" angles; 4½" tubing; ¾" x 3" flats. Write for literature. Specify shape, size and material to be cut.

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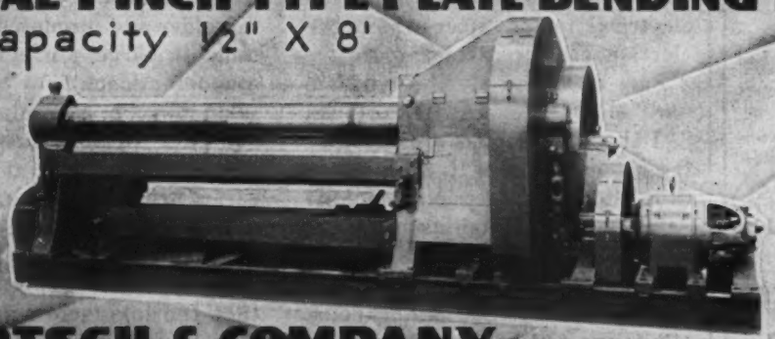
INITIAL PINCH TYPE PLATE BENDING ROLL
Capacity ½" X 8'



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Light and heavy machinery for all classes of sheet metal, plate and structural work

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1000 Cu. Ft. Worthington "Feather Valve," 18" x 11" x 14" two stage with 185 HP synchronous motor on shaft.

AUTOMATIC

4⅜" Conomatic 4 spindle, serial No. 2191K with, reel, chip conveyor, extra equipment.

BORING MILLS

4½ bar Lucas No. 33. Table 46" x 64" Max. height 36", Max. to outboard support 11'.

100" Niles Bement Pond. Extra heavy type. 2 swivel heads, power rapid traverse. 35 HP direct current motor.

BROACH

15 ton 36" stroke American vertical duplex surface with tilting type workholder.

DRILL

42 spindle, No. 816 Natco multiple with 18" x 48" drilling area and two box tables.

GEAR HOBBER

Type T Barber Colman. Designed for either straight or taper splines, helical or spur gears. Also type A and Nos. 3 & 12 Barber Colmans.

GRINDERS

6" x 18", No. 10 Brown & Sharpe "Electric Hydraulic" Three with and two without spindle oscillation. New 1940 and 1941.

10" x 36" Norton type C hydraulic with hydraulic quick in-feed. Serial No. C16458, new in 1942.

10" x 72" Norton type C hydraulic made at factory to swing 14". Serial No. 21750, new in 1944.

23" x 36" Norton type C with mechanical table traverse, hydraulic quick in-feed. Serial No. C18281, new 1943.

LATHE TURRET

No. 2FU Foster Fastermatic Serial No. 2FU529, new in 1944. Quite a little tooling.

MILLERS

Cincinnati Hydromatic Sizes: 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 and 56-90.

PRESSES

1000 ton, No. 666 Toledo knuckle joint Coining. 2½" stroke, 18" shut height, bed 37" F to B x 31" R to L.

350 ton Clearing Crankless, model F1350-42, serial No. 45-11155P, new 1945. 20" stroke, 28" shut height, 36" x 42" bed.

600 ton Hamilton No. 2316½ eccentric shaft forging. Stroke 4"; shut height 16" bed 28" F to B x 23¾" R to L.

No. 506 Bliss on inclined legs with double roll feed and scrap cutter. About 126 tons. 3" stroke, 11½" shut height.

1000 ton Baldwin Southwark "Hy-Speed" hydraulic. 20" stroke, 56" daylight, bed 42" F to B x 54" R to L.

UPSETTERS

2" National. Serial No. 13213. Has suspended slides with long overarm guide. Has 15 HP motor.

4" Ajax. Serial No. 3156. Has twin drive gears, suspended slides, self contained backshaft, 30 HP motor.

MILES MACHINERY CO.
SAGINAW, MICH.

THE CLEARING HOUSE

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Rebuilt electrical items moving well in Cleveland area

New NISA chapter holds first official meeting

Cleveland machinery buyers shopping for price

Fair Activity Level Reported By Cleveland Electrical Dealers

Cleveland — Business is considered to be running at a pretty fair level in used and rebuilt electrical items according to electrical dealers in the Cleveland area. Most dealers report that with the first of the year their activity reached a pace comfortable above that of most of the months of 1949. This activity was said to have persisted through January, dropped slightly during February, and again resumed its level during March and April. Both small and large size motors as well as motor-generator sets and transformer items are reported moving well.

North Central NISA Chapter Holds First Official Meeting

Minneapolis—The Apr. 24 meeting of the North Central chapter of the National Industrial Service Assn. was the first one held under the new charter received from the national office. Two previous organizational meetings were held on Sept. 10 and Dec. 5, 1949.

The meeting featured three Allis-Chalmers sound films on electrical topics, after which the election of officers took place.

Earl H. Wheat of Wheat's Electric Motor Repair, Watertown, S. Dak., was elected president of the group. Charles H. Stocking of C. H. Stocking Electric & Machine Sales Service, Hutchinson, Minn., was elected vice-president, and George P. Svendsen of Boustead Electric & Mfg. Co., Minneapolis, Minn., was elected secretary.

In addition, the following directors were elected, the directors and the officers form the governing body: Carl H. Johnson for district 1; Ernest F. Wolf, district 2; Ben Horvick, district 3; Maurice Hitchell, district 4, and Archie G. Lackore, district 5.

Buyer Price Consciousness Spurs Cleveland Competition

Cleveland — Competition in the used machinery market is close to an all-time high as a result of sporadic demand and a growing price consciousness on the part of buyers, according to used machinery dealers here.

Bulk of the demand is for sheet metalworking equipment, presses and shears, good late model automatics, drilling machines, tool room equipment and production grinders.

Rebuilders are getting a lot of calls to rebuild customers' machines, but in many cases, the cost of rebuilding is 70 to 80 pct of the cost of a new machine, which gives customers cause to ponder.

Availability of used machines is in inverse proportion to the demand pattern. Plants are releasing older and obsolescent machine tools in large numbers, and demand for machinery of this type is at low ebb, according to dealer sources. Dealers are trying to buy such machines at practically scrap prices and in many cases, plants are unwilling to let them go at such prices.

Dealers are generally agreed that the big factors in the pres-

Turn to Page 174

Late Type
High Grade
Heavy Duty

MACHINE TOOLS, PRECISION TOOL ROOM EQUIPMENT, PRODUCTION MACHINERY, FOUNDRY EQUIPMENT, CRANES & SHOP EQUIPMENT

of the

FULTON IRON WORKS COMPANY

1259 DELAWARE AVE., WELLSTON—a suburb of

ST. LOUIS, MISSOURI

TO BE SOLD BY ORDER OF THE STOCKHOLDERS AT

PUBLIC AUCTION

Tue., Wed., Thu., June 6th-7th-8th, 1950

Starting at 10:30 A.M. Each Day
Everything Will Be Sold Piece by Piece
No Confirmation Required—Immediate Delivery

HEAVY DUTY AND TOOL ROOM MACHINERY

CINCINNATI HYPRO 120"x96"x34" DOUBLE HOUSING PLANER; CINCINNATI HYPRO 72"x72"x34" OPEN SIDE PLANER; CINCINNATI HYPRO 10' VERTICAL BORING MILL; 2 GIDDINGS & LEWIS NO. 560F AND NO. 45—4½" AND 6" BORING BARS; SELLERS 5" BORING BAR; NILES 6" BORING BAR; BARRET 7" BORING BAR; LUCAS 3" BORING BAR; 8 GRAY, NILES AND BETTS 120", 60", 48", 43" and 42" DOUBLE HOUSING PLANERS; 7 LODGE AND SHIPLEY, AMERICAN, PUTNAM, NILES AND BRIDGEPORT 24", 36", 42", 48", 54", AND 60" GEARED HEAD AND PLAIN ENGINE LATHES, NEWTON ROTARY PLANER; 2 FULTON 500 TON AND 1500 TON HYDRAULIC PRESSES; 7 CINCINNATI-BICKFORD SUPER SERVICE AND AMERICAN HOLE WIZARD 3', 6', AND 7' RADIAL DRILLS; 15 AMERICAN "PACEMAKER", MONARCH G.H., SOUTH BEND, AMERICAN AND LODGE AND SHIPLEY PRECISION AND TOOL ROOM LATHES; 5 WARNER-SWASEY AND GISHOLT 2A, 1A, NO. 3 PLAIN AND 3L TURRET LATHES; 5 KING, BULLARD AND COLBURN 32" TO 72" VERTICAL BORING MILLS; 2 GLEASON GEAR PLANERS; 5 MILWAUKEE AND CINCINNATI MILLING MACHINES; ROCKFORD SHAPER PLANER; DO ALL SAW; LANDIS GRINDER; KEY SEATERS; THREADERS; POWER SAWS; SHAPERS; SLOTTERS AND MANY OTHER MACHINE TOOLS.

FOUNDRY EQUIPMENT

HYDROBLAST CLEANING SYSTEM; BEARDSLEY & PIPER MODEL S455 SAND SLINGER; HERMAN 7' x 10' JARRING MACHINE; HERMAN JOLT ROLLOVERS; JEFFERY FLASK FILLER; SIMPLICITY "D" SHAKE-OUT; SIMPSON SANDMIXERS AND MULLERS; CLEARFIELD SAND MIXER; COLEMAN "TRANSTRACK" CORE OVENS; ROD STRAIGHTENER; INCLINED SHAKE-OUT UNIT; WHITING CUPOLAS; CONNERSVILLE ROTARY BLOWERS; ROYERSFORD SCREENS; CONVEYORS; NILES FORGING HAMMER; FOUNDRY GRINDERS; TRACK SCALES; FOUNDRY SCALES; FOUNDRY SUPPLIES AND TOOLS.

14—OVERHEAD CRANES FROM 5 TON TO 30 TON CAPACITY POWERHOUSE EQUIPMENT—AIR COMPRESSORS—MATERIALS HANDLING EQUIPMENT

NOTE: **The Fulton Iron Works Company, now in its 98th year, is continuing its business. This sale is for the purpose of disposing of machinery and equipment only. All other operations of the Fulton Iron Works Company will continue as heretofore.**

For Detailed Descriptive Circular WRITE—WIRE—PHONE

SAMUEL L. WINTERNITZ & CO.

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FIRST NATIONAL BANK BLDG. CHICAGO 3, ILL.

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT

D.C. MOTORS

Qu.	HP	Make	Type	Volts	RPM
1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
2	1000	Whse.		450	600
1	650	G. E.	MPC	250	115/145
1	400	Al. Ch.		250	400/800
1	600	G. E.	MPC	600	650
1	800	Whse.		600	750/900
1	500	Whse.		230	300/600
1	325	Whse.	MQ	250	300/900
1	200/300	G. E.	MPC	250	340/920
1	275	Whse.	QM	230	435/850
1	220	Al. Ch.		230	700
1	250	G. E.	MPC	250	400/500
1	150	G. E.		600	250/750
1	150	Cr. Wh.	CCM	230	300/1000
1	150	Cr. Wh.	65H	230	1150
10	150	Cr. Wh.	83H-TEFC	230	900
1	150	G. E.	MPC	230	250/450
1	100	Rel.	1050T	250	400/1200
1	100	G. E.	CD-175	230	345/730
1	100/150	Whse.	SK-300	550	600
1	125	El. Dy.	308	230	750/1500
1	115	Cr. Wh.	JHL	230	1200
1	50/100	G. E.	MPC	230	225/450
3	100	Whse.	SK-184.5	230	475/950
1	100	Whse.	SK	230	1200
1	90	G. E.	CDM-1242-Z	115	1800
1	75	Cr. Wh.	58H	230	860
1	75	Whse.	SK-180L	115	650
2	75	G. E.	CDM-1126-Y	230	2000
1	75	Cr. Wh.	CMC-65H	250	500/1500
1	60	El. Dy.	258	230	525/1050
1	60	Whse.	SK	230	500/1000
1	60	Whse.	SK-130	230	1000
1	50	Cr. Wh.	CCM	230	1750
1	50	El. Dy.	508	500	194/775
1	50	Cr. Wh.	CMC-80H	230	350/750
1	15/50	Cr. Wh.	CMC-81H	230	300/900
2	40	G. E.	CD-1129	230	850/1275
6	25/30	G. E.	CD-105	230	690/2070

MILL & CRANE

2	125	G. E.	CO-1832	230	925
2	60	Whse.	Hoist	230	415
3	50	Whse.	Hoist	230	415
4	50	Whse.	Hoist	230	400
2	30	K. E.	MD-104½AA	550	700

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

EXCELLENT BUYS

60" x 20' NILES BEMENT POND 24 Speed Geared Head Lathe, taper, steady rest, excellent condition.

48" x 30' NILES Heavy Duty Geared Head Lathe, new 1940.

2L GISHOLT Turret Lathe, new 1942, Pre-selector Head, bar feed, collets, hardened ways, taper attach., AC motor. Price $5,850.00.

100" SELLERS Vertical Boring Mill, 2 swivel heads, rapid traverse, Motor Drive, New 1935.

O'CONNELL MACHINERY CO.
1821 Niagara Street Buffalo 7, N. Y.
BEdford 8500

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.
Write For Free 1950 Catalog

BENNETT MACHINERY CO.
and LETCHER W. BENNETT
mean integrity, reliability and financial responsibility when thinking of used metal working machinery and machine tools.
Office—30 Church Street, New York 7, N. Y.
Plant—Clifton, New Jersey

Continued from Page 170

ent used machinery market in this area are these:

(1) Buyers are very price conscious and are shopping for bargains.

(2) Pending liquidation of a number of large industrial plants in this area is delaying decision on a lot of machines out on quotation. Rumor has it that Lustron Corp., Columbus, Ohio, where there is obviously a great deal of sheet handling equipment, and the Ohio Tool Co. are scheduled for the auctioneer's hammer.

(3) Terrific competition from the new machinery builders, some of which are offering trade-in plans, rentals, long-term financing, and other inducements.

(4) The lull which the used machinery market usually experiences in mid-summer arrived prematurely. It follows that dealers expect to be busy this summer.

Cook County Machinery Buys, Transports Ore Separation Mill

Chicago—J. R. Hurwitz of Cook County Machinery Co. is trying his hand in another field. With his partner and several brothers he has purchased an ore separation mill in Joplin, Mo. and transported it to Bingham, New Mex.

There they are constructing a mill that is due for completion and operation about the middle of June. They will crush and separate ore from which they hope to obtain lead, barite and fluorspar.

At present there are about 15 employees getting the mill ready for operation. When completed the mill is expected to have a milling capacity of 250 tons of ore every eight hours. Mr. Hurwitz will continue his management of Cook County Machinery Co. The new company will be known as the Hurlow Mining and Milling Co.

Machine Tool Circular

A partial listing of the rebuilt machine tools offered for sale by this machinery dealer is photo-illustrated in new circular. *Clarence J. O'Brien. For more information, check No. C1 on the postcard on p.* 35.

Resume Your Reading on Page 171

BIG LATHES
AT
BIG SAVINGS

1—48"x26' centers American "Super Productive" Lathe, 2 carriages, 2 taper attachments.

1—48"x26' centers American "Super Productive" Lathe, 1 carriage, taper attachment.

1—48"x52'6" centers American "Super Productive" Lathes, double head, 3 carriages, 3 tapers.

All the above have rapid traverse, 18 speed heads, motors, etc. All are latest type in excellent condition and offered at tremendous savings for immediate delivery.

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Slip Ring MOTORS

2—500 H.P. General Electric Type I form M, 3 ph. 60 cy. 2200 volt, 450 R.P.M.
1—400 H.P. Westinghouse, Type CW, 3 ph. 60 cy. 2200 volt, 514 R.P.M.
Each Complete with Primary Oil Switch and Magnetic Secondary Controllers.

WIRE or PHONE for Special Prices
Before we remove them from present Location.

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Established 1910
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1—#2D Kearney & Trecker Rotary Head Tool & Die Milling Machine, 1943.
1—#22 VS Reed-Prentice Vertical Miller and Die Sinker, 1948.

WIGGLESWORTH MACHINERY CO.
196 Bent St. Cambridge 41, Mass.

ALLIGATOR SHEAR

#4 D & K All-Steel Alligator Shear. Cap. 5" rds., 4¾" sq., 1⅛" x 30" mild plate. High knife type; 36" blades; 16-18 cuts per min.

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